

CLASSIFICATION CANCELED
BY AUTHORITY OF CG-AMC
DATE: 21 OCT 46
*John K. [unclear]
Capt - ac*

~~RESTRICTED~~

AN 01-60JE-1

HANDBOOK FLIGHT OPERATING INSTRUCTIONS

USAF MODELS P-51D AND P-51K SERIES AIRCRAFT

REVISION
NOTICE

**LATEST REVISED PAGES SUPERSEDE
THE SAME PAGES OF PREVIOUS DATE**

Insert revised pages into basic
publication. Destroy superseded pages.

Appendix I of this publication shall not be carried in aircraft on missions where there is a
reasonable chance of its falling into the hands of an unfriendly nation.

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE
AND THE CHIEF OF THE BUREAU OF AERONAUTICS

~~RESTRICTED~~

WF-O-28 JAN 48 3,900

6 NOVEMBER 1945
REVISED 17 DECEMBER 1947

Reproduction of the information or illustrations contained in this publication is not permitted without specific approval of the issuing service.

LIST OF REVISED PAGES ISSUED

INSERT LATEST REVISED PAGES. DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the current revision is indicated by a vertical line in the outer margins of the page.

Page No.	Date of Latest Revision
ii	7 May 1947
2	7 May 1947
* 6	17 December 1947
* 9	17 December 1947
*14	17 December 1947
*15	17 December 1947
*16	17 December 1947
*18	17 December 1947
*19	17 December 1947
*20	17 December 1947
*26	17 December 1947
*28	17 December 1947
*29	17 December 1947
32	7 May 1947
34	7 May 1947
44	7 May 1947
51	7 May 1947
52	7 May 1947
52A	7 May 1947
52B	7 May 1947
53	7 May 1947
54	7 May 1947
55	7 May 1947
56	7 May 1947
57	7 May 1947
58	7 May 1947
59	7 May 1947
60	7 May 1947
61 Deleted	7 May 1947
62 Deleted	7 May 1947
63 Deleted	7 May 1947
64 Deleted	7 May 1947
65 Deleted	7 May 1947
66 Deleted	7 May 1947
67 Deleted	7 May 1947
68 Deleted	7 May 1947
69 Deleted	7 May 1947
70 Deleted	7 May 1947
71 Deleted	7 May 1947
72 Deleted	7 May 1947
73 Deleted	7 May 1947
74 Deleted	7 May 1947
*75	17 December 1947

* The asterisk indicates pages revised, added or deleted by the current revision.

ADDITIONAL COPIES OF THIS PUBLICATION MAY BE OBTAINED AS FOLLOWS:

USAF ACTIVITIES.—In accordance with Technical Order No. 00-5-2.

NAVY ACTIVITIES.—Submit request to nearest supply point listed below, using form NavAer-140: NAS, Alameda, Calif.; ASD, Orote, Guam; NAS, Jacksonville, Fla.; NAS, Norfolk, Va.; NASD, Oahu; NASD, Philadelphia, Pa.; NAS, San Diego, Calif.; NAS, Seattle, Wash.

For listing of available material and details of distribution see Naval Aeronautics Publications Index NavAer 00-500.

USAF

Revised 17 December 1947

TABLE OF CONTENTS

SECTION 1	Description	PAGE			PAGE
1.	General	1	21.	Approach and Landing	23
2.	Block Numbering System	1	22.	Stopping Engine	26
3.	Flight Controls	1	23.	Before Leaving Cockpit	26
4.	Landing Gear	1			
5.	Brakes	5			
6.	Hydraulic System	6			
7.	Power Plant	6			
8.	Fuel System	7			
9.	Oil System	7			
10.	Cooling Systems	7			
11.	Electrical System	7			
12.	Miscellaneous Equipment	7			
SECTION II Pilot's Operating Instructions			Section III Flight Operating Data		
1.	Before Entering Cockpit	9	1.	Airspeed Correction Tables	27
2.	On Entering Cockpit	10			
3.	Fuel System Management	12			
4.	Starting Engine	13			
5.	Warm-up and Ground Test	14			
6.	Scramble Take-off	15			
7.	Taxiing Instructions	15			
8.	Before Take-off	15			
9.	Take-off	16			
10.	Engine Failure During Take-off	17			
11.	Climb	18			
12.	During Flight	18			
13.	Engine Failure During Flight	20			
14.	Flying Characteristics	20			
15.	Stalls	20			
16.	Spins	21			
17.	Permissible Acrobatics	22			
18.	Diving	22			
19.	Gliding	23			
20.	Night Flying	23			

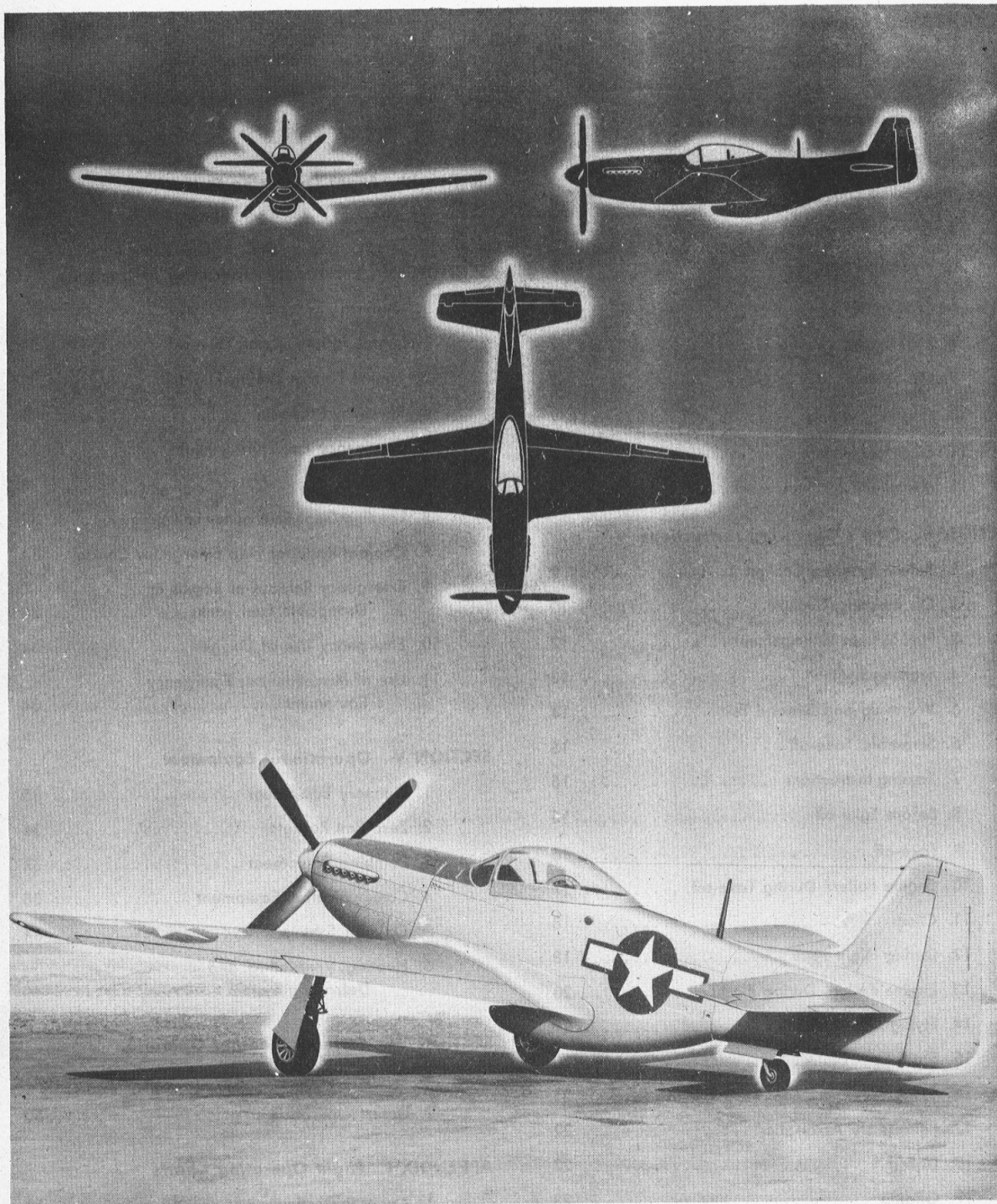
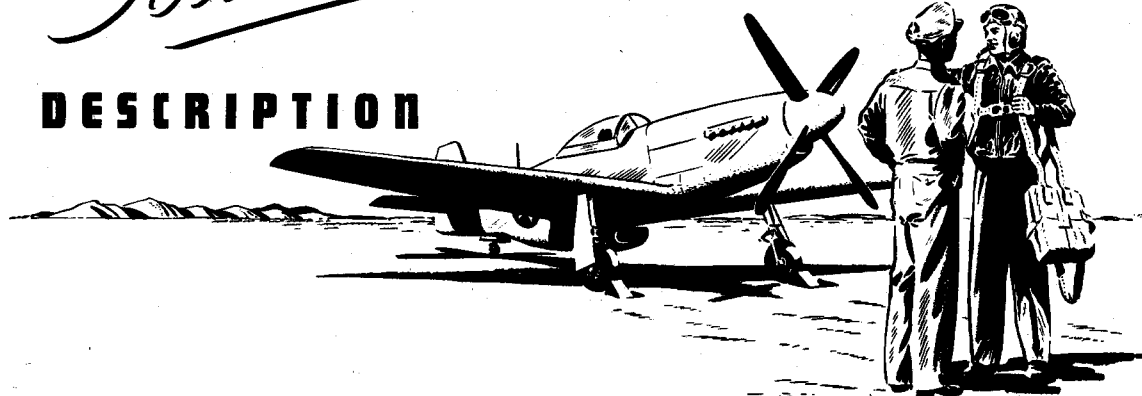


Figure 1—Three-quarter Rear View of Airplane

Section I

DESCRIPTION



1. GENERAL.

The North American P-51D and P-51K Fighter Airplanes are single-place, low-wing monoplanes having a wing span of 37 feet, a length of 32 feet 2 inches, and a height (tail down) of 13 feet 8 inches. The gross weight with no external load, full fuel, and armament is approximately 10,000 pounds. The power plant is either a V-1650-7 or V-1650-3 engine. The airplanes are armed with six .50-caliber machine guns and may be equipped with bomb racks to carry bombs, depth charges, chemical tanks, or fuel tanks. Late airplanes are equipped to carry zero rail rockets. Armor plate protection is shown in figure 50.

The only difference between the airplanes designated as P-51K and those designated as P-51D is that the P-51D Airplanes are equipped with Hamilton Standard four-blade propellers; the P-51K Airplanes are equipped with Aero-products four-blade propellers. There is no difference in the operation of the two airplane models.

2. BLOCK NUMBERING SYSTEM.

To clarify the relationship between the various groups of serial numbers used on these P-51 Airplanes, the following block numbering system has been adopted.

BLOCK NUMBER	SERIAL NUMBER INCLUDED
P-51D-5-NA	AAF44-13253 to 14052
P-51D-10-NA	AAF44-14053 to 14852
P-51D-5-NA	AAF44-14853 to 15752
P-51D-20-NA	AAF44-63160 to 64159
	AAF44-72027 to 72626
P-51D-25-NA	AAF44-72627 to 74226
P-51D-30-NA	AAF44-74227 to 75026
P-51D-5-NT	AAF44-11153 to 11352
P-51K-1-NT	AAF44-11353 to 11552

BLOCK NUMBER

P-51K-5-NT
P-51K-10-NT
P-51K-15-NT
P-51D-20-NT
P-51D-25-NT

P-51D-30-NT

SERIAL NUMBER INCLUDED

AAF44-11553 to 11952
AAF44-11953 to 12552
AAF44-12553 to 12852
AAF44-12853 to 13252
AAF44-84390 to 84989
AAF45-11343 to 11542
AAF45-11543 to 12342

3. FLIGHT CONTROLS.

The ailerons, elevators, and rudder are conventionally operated by a control stick and rudder pedals. Trim tab controls (a wheel for the elevator tabs, and knobs for the rudder and aileron tabs) and the flap control lever are on the control pedestal at the left side of the cockpit. A surface control lock is forward of the base of the control stick. A dorsal fin and reverse boost rudder tab have been installed on most airplanes. On late airplanes and on some airplanes modified in service, a 20-pound bobweight has been added to the elevator control system to improve the flight characteristics. (See section II, paragraph 14. b.)

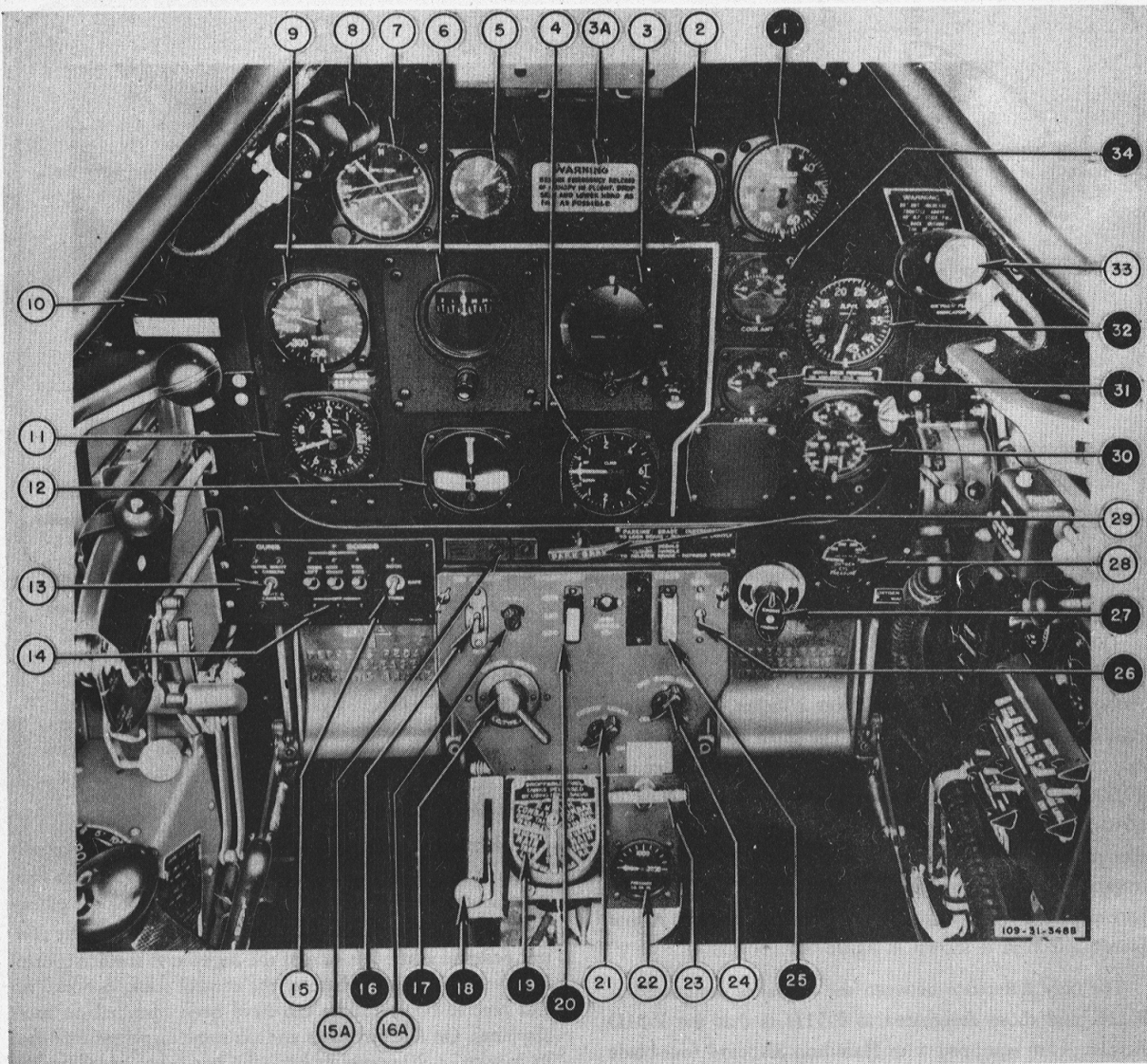
4. LANDING GEAR.

a. GENERAL.—The landing gear is hydraulically operated. When the surface control stick is pulled back, the tail wheel is linked to the rudder pedals and is steerable 6 degrees right or left. With the control stick forward, the tail wheel is unlocked and full-swiveling.

CAUTION

Do not move the landing gear control when airplane is on the ground, as there is no safety mechanism to keep the gear from retracting.

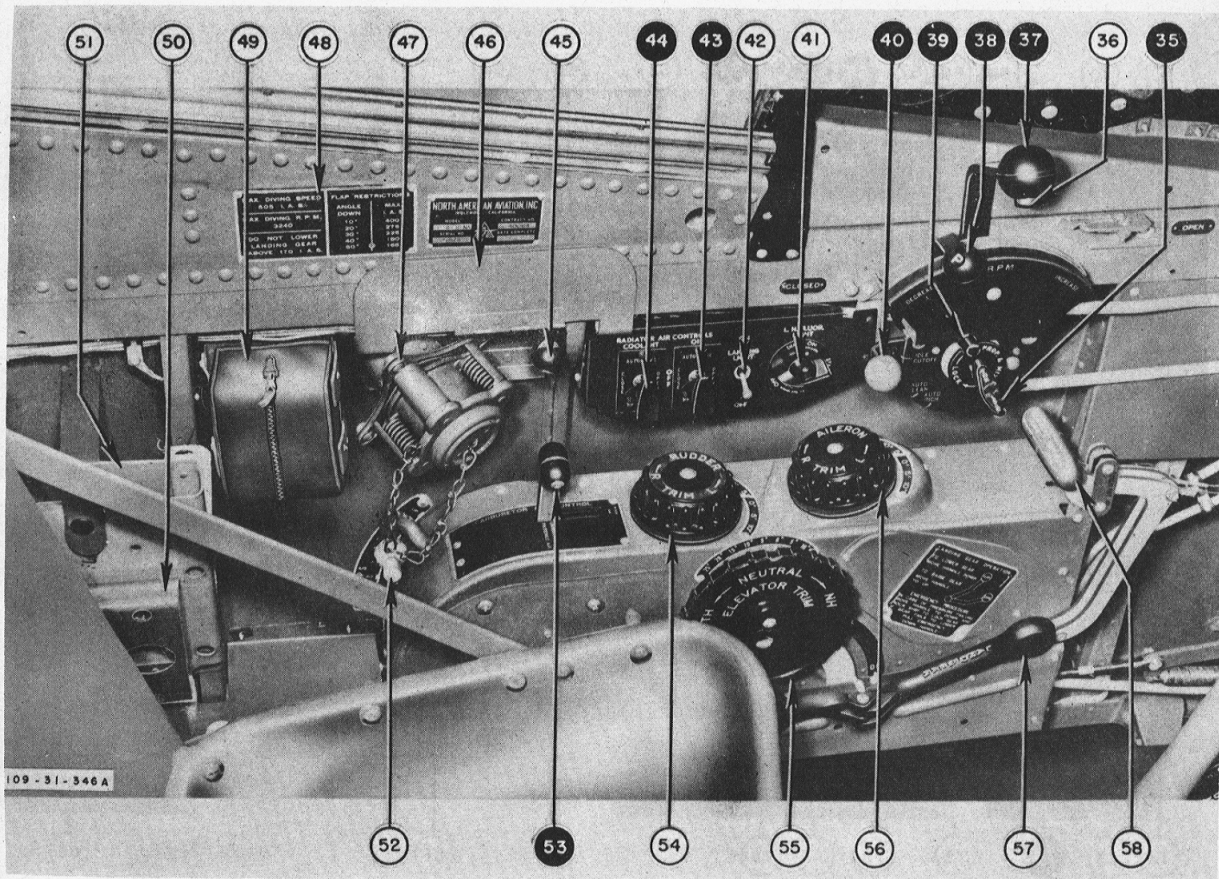
b. LANDING GEAR WARNING SIGNALS (Late Airplanes).—On late airplanes, the landing gear warning signal system consists of a red and a green warning light at the



- | | | |
|---|--------------------------------------|--|
| 1. Manifold Pressure Gage | 13. Gun and Camera Safety Switch | 24. Gun Sight Rheostat |
| 2. Suction Gage | 14. Bomb Arming Switches | 25. Starter Switch |
| 3. Flight Indicator | 15. Bomb Release Selector Switch | 26. Oil Dilution Switch |
| 3A. Canopy Emergency Release Placard | 15A. Landing Gear Position Indicator | 27. Engine Primer |
| 4. Rate-of-Climb Indicator | Lights | 28. Oxygen Pressure Gage |
| 5. Clock | 16. Fuel Booster Pump Switch | 29. Parking Brake Handle |
| 6. Directional Gyro | 16A. Warning Horn Silencer Button | 30. Oil Temperature and Fuel and Oil Pressure Gage |
| 7. Remote-reading Compass Indicator | 17. Ignition Switch | 31. Carburetor Air Temperature Indicator |
| 8. Fluorescent Light | 18. Fuel Shut-off Control | 32. Tachometer |
| 9. Airspeed Indicator | 19. Fuel Selector Control | 33. Fluorescent Light |
| 10. Landing Gear Warning Signal Test Switch | 20. Supercharger Control Switch | 34. Coolant Temperature Gage |
| 11. Altimeter | 21. Cockpit Light Switch | |
| 12. Bank-and-Turn Indicator | 22. Hydraulic Pressure Gage | |
| | 23. Fairing Door Emergency Control | |

Indicates power plant and fuel system controls and instruments.

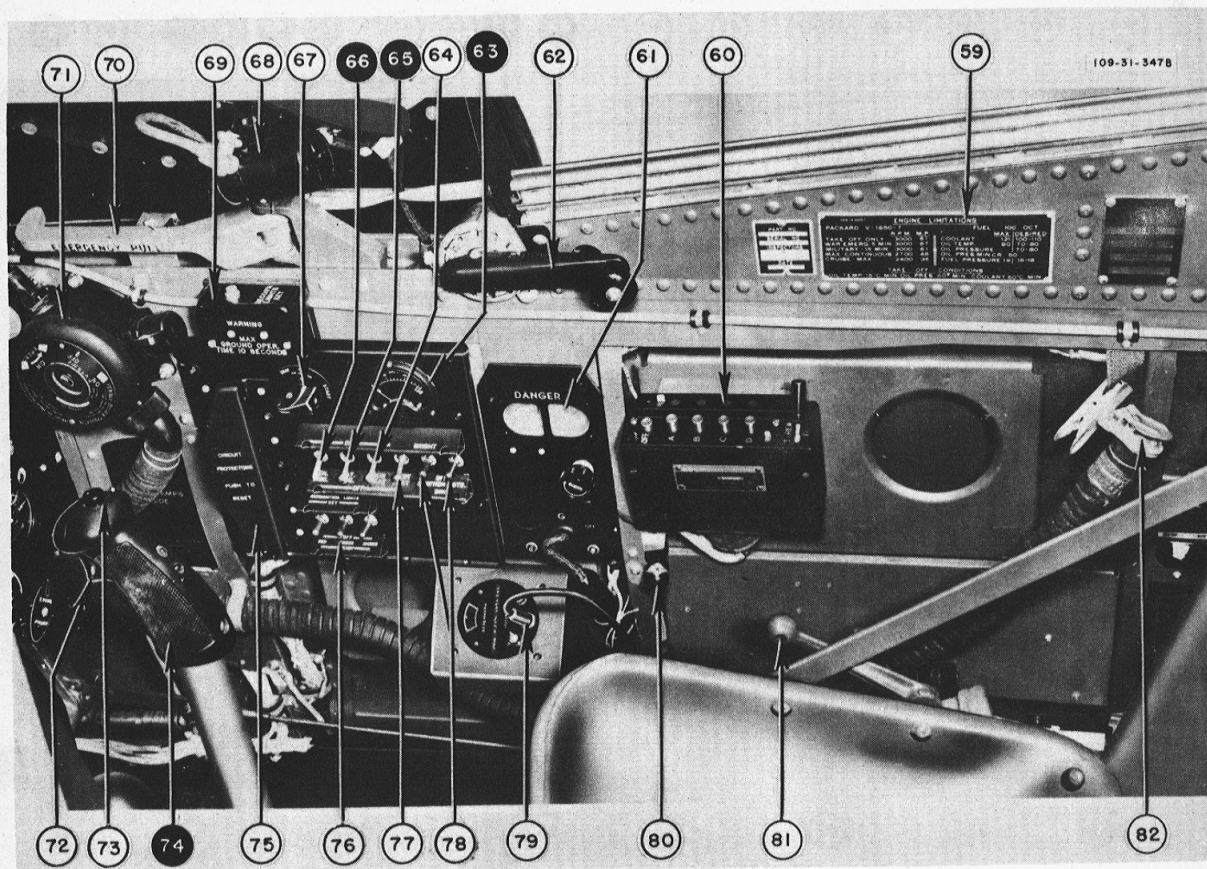
Figure 2—Cockpit—Forward View (Typical of All Models)



- | | |
|---|--------------------------------|
| 35. Throttle Friction Lock | 46. Arm Rest |
| 36. Radio Transmit-Receive Switch | 47. Signal Pistol Mount |
| 37. Throttle Control | 48. Airplane Restriction Plate |
| 38. Propeller Control | 49. Signal Pistol Stowage Case |
| 39. Propeller and Mixture Control Friction Lock | 50. Drop Message Bag Holder |
| 40. Mixture Control | 51. Map Case |
| 41. Left-hand Fluorescent Light Switch | 52. Wing Flap Control |
| 42. Landing Light Switch | 53. Carburetor Air Control |
| 43. Oil Radiator Air Control Switch | 54. Rudder Trim Tab Control |
| 44. Coolant Radiator Air Control Switch | 55. Elevator Trim Tab Control |
| 45. Cockpit Light | 56. Aileron Trim Tab Control |
| | 57. Landing Gear Control |
| | 58. Bomb Salvo Control Handles |

⊗ Indicates power plant and fuel system controls and instruments.

Figure 3—Cockpit—Left Side (Typical of All Models)



- | | |
|---|---------------------------------|
| 59. Engine Limitations Plate | 71. Oxygen Regulator |
| 60. SCR-522-A Radio Control Box | 72. Gun Trigger Switch |
| 61. Detonator Switches | 73. Bomb Release Switch |
| 62. Canopy Handcrank | 74. Surface Control Stick |
| 63. Ammeter | 75. Circuit-breaker Reset Guard |
| 64. Gun Heater Switch | 76. Recognition Light Switches |
| 65. Battery-disconnect Switch | 77. Pitot Heater Switch |
| 66. Generator-disconnect Switch | 78. Position Light Switches |
| 67. Right-hand Fluorescent Light Switch | 79. Detrola Receiver |
| 68. Fluorescent Light | 80. Cockpit Light |
| 69. Recognition Light Keying Switch | 81. Seat Adjustment Handle |
| 70. Canopy Emergency Release Handle | 82. Oxygen Mask Connection |

⊗ Indicates power plant and fuel system controls and instruments.

Figure 4—Cockpit—Right Side (Typical of All Models)

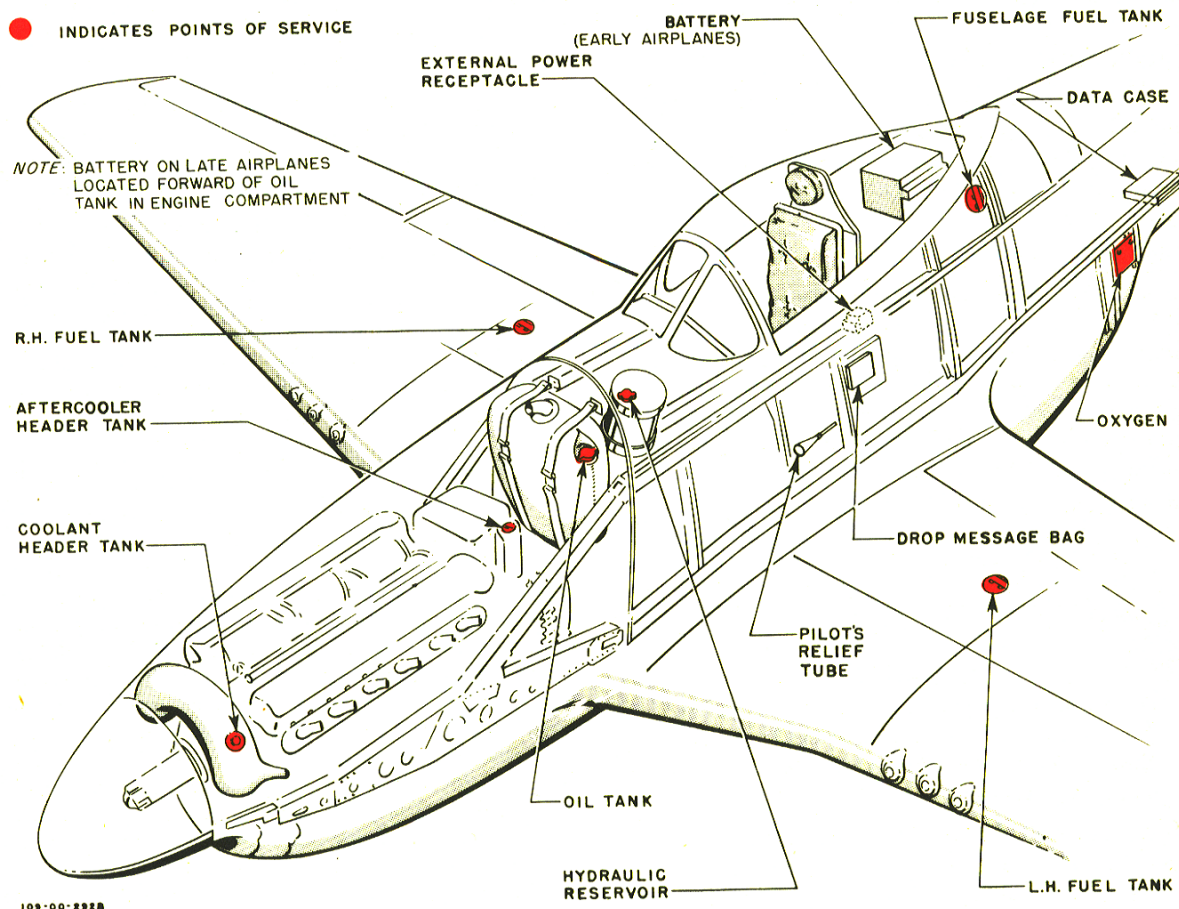


Figure 5—Interior Arrangement

left of the instrument panel, and a warning horn located on the left side of the cockpit, aft of the pilot's seat. (See figure 25.) Both warning lights have dimmer masks and are of the push-to-test type. The signals operate in the following manner:

(3) *Green light off, red light off* when gear is up and down and locked, regardless of throttle or fairing door position.

(2) *Green light off, red light on* when gear is in any unlocked position, regardless of throttle position; or when the gear is up and locked and the fairing doors are not fully closed.

(3) *Green light off, red light off* when gear is up and locked with fairing doors fully closed and throttle forward (beyond minimum cruising power).

(4) On early airplanes, *green light off, red light on, and horn on* when gear is up and locked and throttle is retarded below minimum cruising power.

(5) On late airplanes, *green light off, red light on, and horn on* when gear is in any position other than down

and locked and throttle is retarded below minimum cruising power.

Note

A horn cutout switch is on the front switch panel. When the throttle is advanced after the horn has been cut out, the horn circuit is automatically reset. While the throttle is retarded and the horn is cut out, the red light remains on until the gear reaches the down-and-locked position.

c. **LANDING GEAR WARNING LIGHT** (Early Airplanes).—Some early airplanes do not have the green light or warning horn. The red light operates the same on all airplanes (when main gear is in transit between up-and-locked and down-and-locked positions or when gear is up and throttle is retarded for landing), but it is tested with a switch in early installations.

5. BRAKES.

The brakes are hydraulically operated. Fluid for the brake system is obtained from the hydraulic reservoir. A standpipe in the reservoir reserves a supply of fluid for brake operation in case fluid for the hydraulic system is lost. The parking

brake control is just below the center of the instrument panel.

6. HYDRAULIC SYSTEM.

The landing gear and wing flaps are operated hydraulically. The wing flaps are preselectively set by moving the control to the desired flap setting. The flaps are automatically held in the position chosen until another flap setting is selected.

7. POWER PLANT.

a. ENGINE.—The Packard-built Rolls Royce V-1650-7 and V-1650-3 are 12-cylinder, liquid-cooled, in-line engines. They are equipped with two-stage, two-speed superchargers, injection-type carburetors, and automatic manifold pressure regulators. An aneroid switch automatically controls the supercharger blower shift on both models. The engines turn either a Hamilton Standard or an Aeroproducts propeller.

b. FUEL, OIL, AND COOLANT.

Fuel—Specification No. AN-F-48, Grade 100/130

Oil—Specification AN-O-8, Grade 1120

Coolant—Type D (70 percent water and 30 percent ethylene glycol, Specification No. AN-E-2, inhibited with NaMBT)

Note

For operation in temperatures below -12°C , use Type C coolant (30 percent water and 70 percent ethylene glycol, Specification No. AN-E-2, inhibited with NaMBT).

c. AUTOMATIC MANIFOLD PRESSURE REGULATOR.—On the V-1650-3 or V-1650-7 engine, the regulator is not sensitive to manifold pressure changes throughout the entire range of available supercharger pressures. When operating at powers between 42 and 61 in. Hg manifold pressure, the regulator should afford constant manifold pressure within plus or minus one inch for any flight attitude below the critical altitude for the flight condition in question. However, when operating below approximately 42 in. Hg manifold pressure, the regulator cannot be expected to hold a constant manifold pressure for the various flight conditions.

d. ENGINE CONTROLS.

(1) **THROTTLE.**—On late airplanes, a gate on the engine control quadrant limits the manifold pressure to 61 in. Hg, with the throttle full forward. Moving the throttle past the gate enables the pilot to obtain a war emergency power of 67 in. Hg. On early airplanes, which have no gate position, war emergency power is obtained by pulling the emergency boost control, at the left of the instrument panel. Instructions on the use of the War Emergency Rating are given in section II, paragraph 12. b.

(2) **MIXTURE.**—On late P-51D and P-51K Airplanes, the mixture control has the following settings: "IDLE CUT OFF," "RUN," "AUTO RICH" (marked only on some late airplanes), and "EMERGENCY FULL RICH." The carburetor

on these airplanes is fully automatic, and the normal operating position is "RUN."

Note

"RUN" position is recommended for take-off; however, "AUTO RICH," supplied on late airplanes as an alternate position for take-off, may be used. Return the control to "RUN" when a safe altitude is reached.

The "EMERGENCY FULL RICH" position is for use in case the carburetor fails to operate properly in "RUN." To place the control in "EMERGENCY FULL RICH," a spring detent on the lever must be pressed with the thumb and the control moved through the lockwire at the "RUN" position (at "AUTO RICH" on late airplanes). On early P-51D and early P-51K Airplanes, the mixture control positions are "IDLE CUT OFF," "AUTO LEAN," and "AUTO RICH" with no lockwire.

(3) AUTOMATIC SUPERCHARGER CONTROL.

(a) The supercharger control switch has three positions: "LOW," "AUTOMATIC," and "HIGH." (See figures 13 and 14.) The switch should be in "AUTOMATIC" for all normal operations. When it is in this position, supercharger speed change is controlled by an aneroid-type pressure switch, vented to carburetor intake pressure. The aneroid switch will change the blower speed from low to high at the altitude for best performance at military power. It is calibrated to shift the supercharger to high blower at a carburetor entrance pressure equivalent to approximately 19,600 feet altitude on the V-1650-3 engine (between 20,800 and 24,800 feet airplane altitude) and to approximately 14,500 feet altitude on the V-1650-7 engine (between 15,700 and 19,700 feet airplane altitude). To prevent excessively frequent blower speed changes, resulting from small speed or altitude changes near shift altitude, the aneroid switch is constructed so that the shift downward from high to low speed occurs approximately 1500 feet below the upward shift point during a normal descent. However, during a dive or rapid descent, the shift downward may occur at, or above, the upward shift point because of the increase of ram air pressure in the carburetor air intake caused by the higher airspeed.

Note

It will be noted in flight that the blower shift altitude specified in the preceding paragraph (a) for the particular engine does not correspond to the figure read by the pilot on the altimeter. This condition is normal, since the blower shift aneroid is referenced to carburetor entrance air pressure which increases with increase in indicated airspeed. Differences in airplane altitude at the time of blower shift are due to the ram variations in climb, level flight, and descent.

(b) For maximum fuel mileage on long-range cruising operations, it is advantageous to remain in low blower speed above the altitude of shift. The ranges shown on the charts in appendix I are possible only when using proper supercharger speed, exactly as noted.

(c) In case of blower shift aneroid failure, the supercharger will automatically return to low speed and the amber light beside the manual blower switch will go out. This light is on only when the supercharger is in "HIGH." On late airplanes the light is of the push-to-test type.

(4) **ENGINE PRIMER.**—Early airplanes have a hand-priming system. On late airplanes, the priming system is controlled by an electric switch. (See figures 13 and 14.)

e. **CARBURETOR AIR.**—Ram air, unrammed filtered air, or (on late airplanes) unrammed hot air may be supplied to the carburetor. Early airplanes have only a cold air control; late airplanes have both a cold and hot air control. Figure 49 shows the principle of operation. In order to obtain hot air, the hot air control must be in "HOT" and the cold air control must be in "UNRAMMED FILTERED AIR." If the cold air control is in "RAM AIR," operation of the hot air control will be ineffective. On all airplanes, hot air will automatically be admitted to the carburetor whenever the air duct becomes obstructed by ice. For further information on the carburetor heat system, see section VI, paragraph 1. a. (4).

8. FUEL SYSTEM.

Two self-sealing tanks are carried in the wing, and an auxiliary 85-gallon, self-sealing tank is installed in the fuselage, aft of the cockpit. Two 75-gallon, pressurized drop tanks may be installed on the wing racks. Fuel flows as follows: from either of the wing tanks or the fuselage tank through a booster pump to the fuel selector valve; through the selector valve, shut-off valve, and fuel strainer to the engine-driven fuel pump; then to the carburetor. Fuel from the combat tank flows through the selector valve into the main fuel line. All main fuel lines are self-sealing. Late airplanes have the carburetor vapor return line routed to the fuselage tank. On other airplanes the vapor return line is connected to the left wing tank. It is important that you know to which tank the vapor return line is connected. (See section II, paragraph 3.) The booster pump switch on early airplanes has three positions: "NORMAL," "EMERGENCY," and "OFF." On late airplanes, the switch has two positions: "ON" and "OFF." (See figures 13 and 14.)

CAUTION

As neither the wing nor the bomb racks were designed for the 110-gallon combat tanks, it is not recommended that these tanks be used. If this installation is necessary to accomplish particular missions, the airplane should be held to straight and level flight until the tanks are released.

9. OIL SYSTEM.

The oil system has a capacity of 21 US (17.5 Imperial) gallons. Scavenged oil flows through an oil radiator in the air scoop assembly. A thermostatically controlled outlet flap regulates the flow of air through the radiator. An oil dilution system is provided. (See figures 13 and 14 for location of control.)

10. COOLING SYSTEMS.

The engine incorporates two separate cooling systems: one to cool the engine, and the other to cool the supercharger fuel-air mixture. Each system has a separate pump, expansion tank, and radiator. The engine cooling system radiator and aftercooling system radiator are constructed as a unit which is located in the air scoop assembly above and aft of the oil radiator. A thermostatically controlled outlet flap regulates the flow of air through the radiators. The controlling switch for the flap actuator, located on the front switch panel, has four positions: "AUTOMATIC" for normal operation; two emergency manual positions, "OPEN" and "CLOSE," and an "OFF" position. A spring-loaded guard holds the switch in "AUTOMATIC," the position used for all operation except for control failure and during ground check. A manual emergency release, on the right side of the cockpit floor, is provided on late airplanes to open the flap in case of actuator failure.

11. ELECTRICAL SYSTEM.

The 24-volt, direct-current electrical system receives power from an engine-driven generator. A 34-ampere hour battery serves as a stand-by. An external power socket is on the right side of the fuselage just behind the cockpit. External power should be used instead of the airplane battery to start the engine and operate the electrical system while the airplane is on the ground. An adapter for connecting the British type of external power supply is stowed adjacent to the external power socket. All of the electrical circuits are protected by either circuit breakers or circuit-breaker switches located on the right switch panel. On airplanes which have the zero rail rocket installation, the armament control switches are on the front switch panel and most of the engine control switches are on a separate panel at the left. (See figures 14 and 37.) Location of main electrical switches is shown in figures 2 and 4. On late airplanes the upper recognition light has been deleted.

12. MISCELLANEOUS EQUIPMENT.

a. **PILOT'S RELIEF TUBE.**—The relief tube horn is stowed on a bracket on the floor of the cockpit at the left of the pilot's seat.

b. **ENGINE CRANK.**—Early airplanes have an engine crank and extension tube stowed in brackets at the back of the right main landing gear well. On late airplanes, these parts have been deleted.

c. **DROP MESSAGE BAG.**—A drop message bag is contained in a holder on the map case cover.

d. **DATA CASE AND TAIL POSITION LIGHT LENSES.**—A data case is fastened to the access door on the underside of the fuselage, just forward of the tail wheel. On late airplanes, a case containing three tail position light lenses (red, green, and clear) is accessible through this door.

e. **ARM REST.**—A folding arm rest is on the left longitudinal, aft of the engine control quadrant.

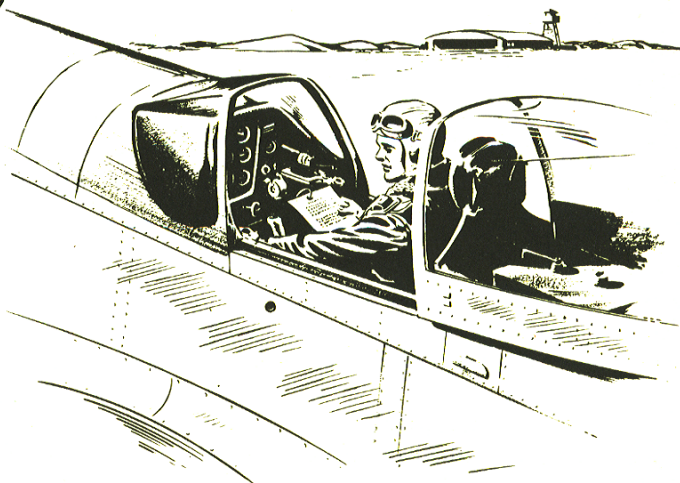
Section I
Paragraph 12

f. **ANTI-G SUIT PROVISIONS.**—An air pressure outlet connection on the left side of the pilot's seat provides for attachment of the air pressure intake tube of the anti-G suit. Air pressure for the inflation of the anti-G suit bladders is supplied from the exhaust side of the engine-driven vacuum pump, and is regulated by a type M-2 valve which is a junction point for pressures exerted in both the droppable combat fuel tanks and the anti-G suit. If combat tanks are installed on the airplane, the acceleration force (G load) required to

actuate the M-2 valve should be approximately 3 to 3½ G's because of the approximate 5-pound-per-square-inch pressure exerted in the tanks. Without the combat tanks installed, the valve should open at 2 G's. After the valve opens, pressure is passed through a regulator valve into the suit in proportion to the G force imposed. For every 1 G acceleration force, a corresponding one-pound-per-square-inch air pressure is exerted in the anti-G suit.

Section II

NORMAL OPERATING INSTRUCTIONS



1. BEFORE ENTERING COCKPIT.

- a. Note carefully the following:

FLIGHT RESTRICTIONS

1. When external fuel tanks are installed, only normal flying attitudes are permitted.
2. Inverted flying must be limited to 10 seconds because of loss of oil pressure and failure of the scavenge pumps to operate in an inverted position.
3. No acrobatics are permitted with more than 40 gallons of fuel in the fuselage tank.
4. Intentional "power-off" spins are permitted, provided such spins are started above 12,000 feet. Intentional "power-on" spins and snap rolls are prohibited. It is impossible to do a good snap roll with the airplane, and most attempts usually end up in a power spin.
5. Slow rolls are prohibited if the airplane is not equipped with a dorsal fin and reverse boost rudder tab.
6. If 110-gallon combat tanks or 1000-pound bombs are installed, airplane is restricted to level flight until tanks or bombs are released.

AIRSPPEED LIMITATIONS

1. The maximum permissible speed is 505 IAS or .75 Mach, whichever is less. See figures 26 or 27 for diving speed limits at altitude.
2. Observe the following wing flap setting airspeed restrictions:
 - With wing flap setting at 10 degrees, do not exceed 400 IAS.
 - With wing flap setting at 20 degrees, do not exceed 275 IAS.
 - With wing flap setting at 30 degrees, do not exceed 225 IAS.
 - With wing flap setting at 40 degrees, do not exceed 180 IAS.
 - With wing flap setting at 50 degrees, do not exceed 165 IAS.
3. In a sideslip, stay above 110 IAS.
4. Do not extend landing gear above 170 IAS.
5. With droppable 75-gallon combat fuel tanks installed, speed is limited to about 400 IAS due to incipient buffeting.

THESE LIMITATIONS MAY BE SUPPLEMENTED OR SUPERSEDED
BY INSTRUCTIONS INCLUDED IN SERVICE PUBLICATIONS.

b. Make sure the airplane has been serviced and is ready for flight, particularly in regard to proper quantities of fuel, oil, coolant, hydraulic fluid, and oxygen.

c. Ascertain that the total weight of fuel, oil, ammunition, and special equipment carried is suited to the mission to be performed. This is most important on combat missions, as the rate of climb of the airplane may vary as much as 500 feet per minute, depending on the load carried.

d. See that external power supply (if available) is connected.

e. Prior to any ground run-up exceeding 40 in. Hg manifold pressure, see that the tail of the airplane is anchored securely to a fixed object. If wheel chocks are available, use them also.

f. To gain access to cockpit, push in on spring-loaded door on left forward side of sliding canopy, and slide canopy aft.

CAUTION

In order to avoid cracking the windshield panels, do not grasp the windshield frame when entering or leaving the airplane.

2. ON ENTERING COCKPIT.

Note

A pilot's check list and an engine limitations plate are provided in the cockpit for a quick check of airplane operations.

a. Perform the following operations prior to all flights:

(1) Adjust rudder pedals for proper leg length to obtain full brake control while taxiing. Press foot against the lever on the inner side of each rudder pedal. (See figure 6.)

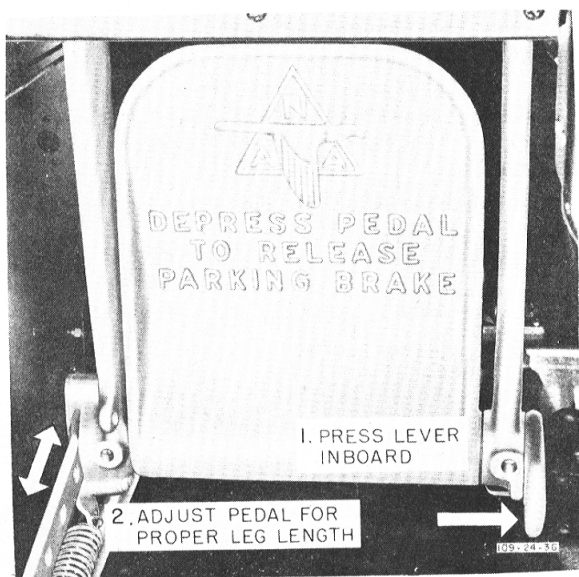


Figure 6—Rudder Pedal Adjustment

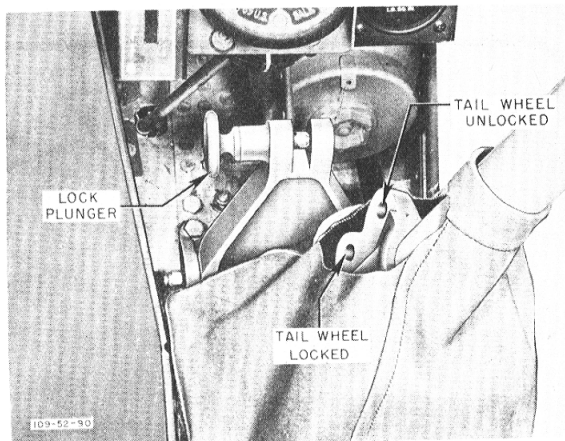


Figure 7—Surface Control Lock

(2) Adjust the seat level to obtain full travel of the rudder pedals in the extreme positions. The adjustment lever is on the right side of the seat.

(3) See that ignition switch is "OFF."

(4) Set parking brakes.

(5) See that the bomb and gun safety switches are "OFF."

(6) See that landing gear control handle (figure 3—item 57) is in the "DOWN" position.

(7) Unlock surface control lock at the base and just forward of the control stick by pulling the plunger on left side of the lock. (See figure 7.) Check the controls for free and proper movement, watching control surfaces for correct response.

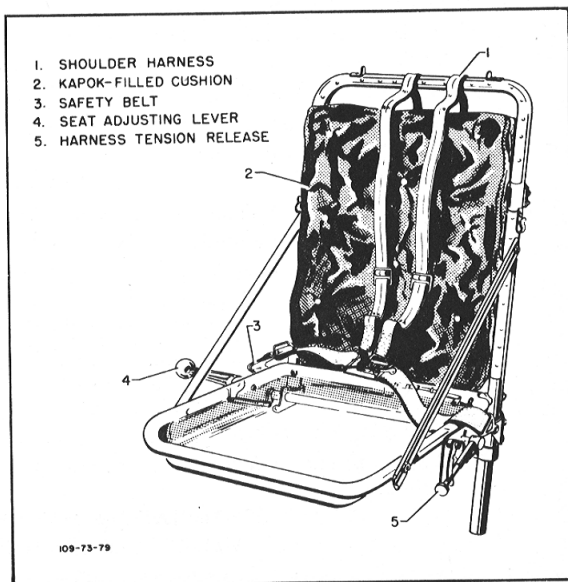


Figure 8—Pilot's Seat

- (8) Set altimeter to correct barometric pressure.
- (9) Check remote-reading compass for correct reading.
- (10) Turn "ON" generator-disconnect switch. (See figure 4—item 66.) If external power is not used, turn "ON" battery-disconnect switch. (See figure 4—item 65.)
- (11) Check landing gear warning lights by pushing lamp housing or push-to-test switch.
- (12) Test gun sight illumination by operating rheostat control. (Gun safety switch must be on "SIGHT AND CAMERA" or "GUNS, SIGHT, AND CAMERA.")
- (13) Turn "OFF" generator-disconnect switch. (If battery-disconnect switch is "ON," turn it "OFF.")
- (14) Close sliding canopy. (See figures 9 and 10.)

b. When night flying is anticipated, make the following additional checks with the generator-disconnect switch "ON." (If no external power, battery-disconnect switch "ON.")

- (1) Test fluorescent instrument lights by operating rheostat controls. The control for the left light is on the radiator air control panel; the control for the right light is on the right-hand switch panel.
- (2) Test position lights by moving switch on right-hand switch panel to "BRIGHT" and "DIM."
- (3) Test landing light by operating switch on radiator air control panel.
- (4) Test cockpit swivel lights by turning on switch located on lamp housing. The cockpit light master switch on the front switch panel must be "ON" before turning on the lights.
- (5) Test operation of recognition lights; the switches are on the right-hand switch panel. The keying switch is on the right longeron.

Note

Do not operate recognition lights longer than 10 seconds on the ground.

- (6) Turn "OFF" generator-disconnect switch. (If battery-disconnect switch is "ON," turn it "OFF.")

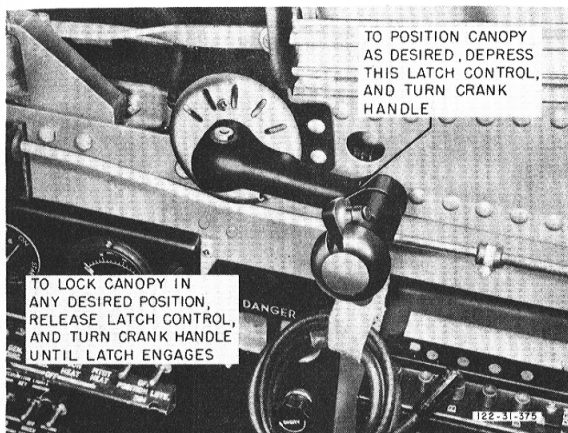
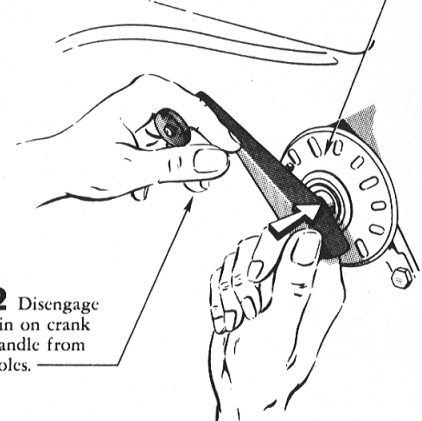


Figure 9—Sliding Canopy Operation—Late Airplanes

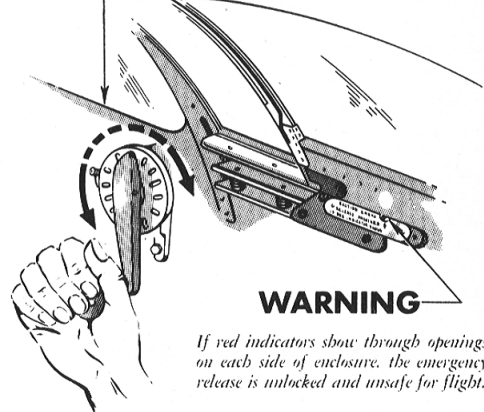
TO OPERATE CANOPY WITH HANDCRANK

- 1 Push on crank axle to engage clutch.



- 2 Disengage pin on crank handle from holes.

- 3 Turn crank in desired direction, holding knob inboard. Lock canopy by engaging pin in nearest hole.



TO OPERATE CANOPY MANUALLY

Pull out on crank handle to disengage clutch. Canopy will then be free-sliding.

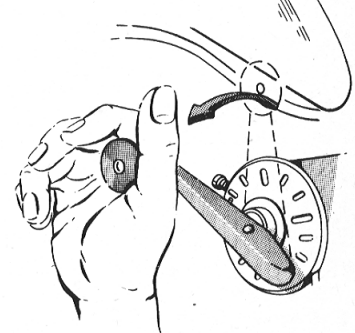


Figure 10—Sliding Canopy Operation—Early Airplanes

109-31-357

3. FUEL SYSTEM MANAGEMENT.

CAUTION

Keep fuel booster pump operating at all times during flight to ensure adequate fuel pressure. The electrical circuit is connected through a switch to the fuel selector valve; therefore, turning the valve from one position to another automatically shuts off the booster pump in the tank formerly used and starts the pump in the tank selected, provided that the booster pump switch is "ON" ("NORMAL" or "EMERGENCY" in early airplanes).

a. Take off and climb with the fuel selector on "MAIN TANK L.H.," and the booster pump switch in "EMERGENCY" (early airplanes) or "ON" (late airplanes).

b. When a safe altitude has been reached, move the booster pump switch to "NORMAL" (early airplanes) or leave at "ON" (later airplanes), move fuel selector to "FUS. TANK," and cruise on the fuselage tank fuel until only 25 gallons remain.



Figure 11—Fuel Selector Control

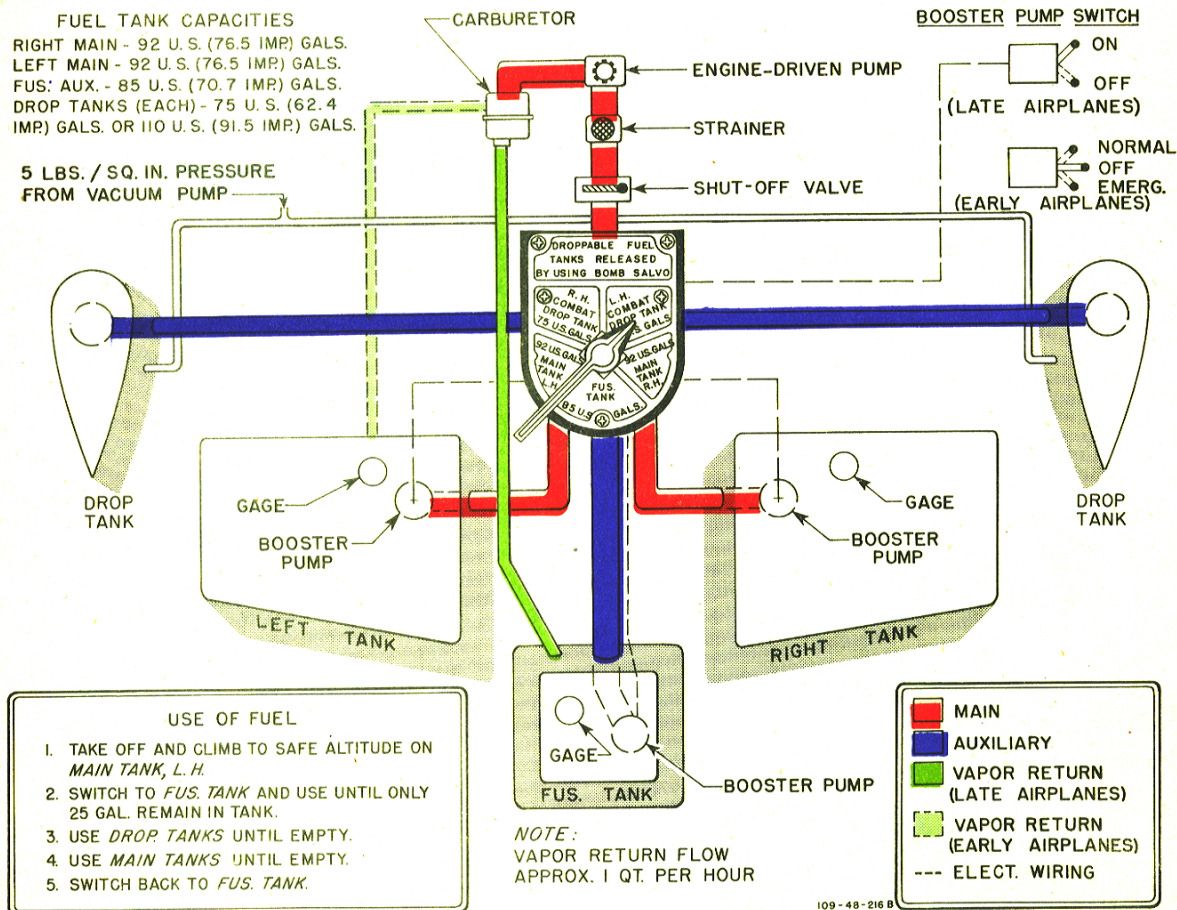


Figure 12—Fuel System Line Diagram

WARNING

The carburetor vapor return line feeds to the fuselage tank on later airplanes (to the left-hand main tank on early airplanes); therefore, it is necessary to use fuel from the fuselage tank first.

CAUTION

Retain approximately 25 gallons in the fuselage tank to keep the CG of the airplane in the optimum position for landing.

c. After draining the fuselage tank to 25 gallons, move the fuel selector to either of the droppable tank positions and use fuel from them alternately until they are empty.

Note

The combat tanks have no booster pump; a controlled pressure of 5 pounds per square inch is maintained within them by the exhaust side of the vacuum pump.

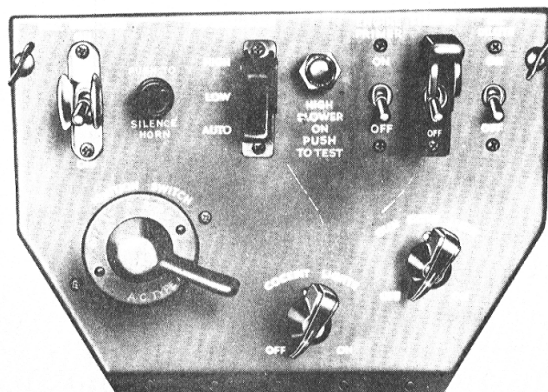
d. Switch fuel selector to "MAIN TANK L.H." or "MAIN TANK R.H."; then alternately use fuel from the left and right main tanks until the wing tanks are empty, to avoid wing heaviness.

e. When wing tanks are empty, switch fuel selector back to "FUS. TANK."

4. STARTING ENGINE.

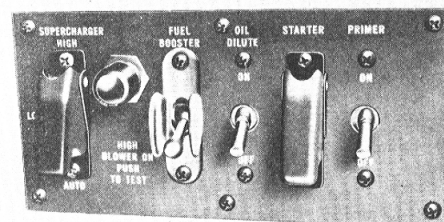
a. Follow this procedure when starting the engine.

- (1) See that ignition switch is "OFF."
- (2) See that mixture control is in "IDLE CUT OFF."
- (3) Have ground personnel pull the propeller through 8 blades.



109-54-286B

Figure 13—Front Switch Panel—Early Airplanes



122-43-73

Figure 14—Engine Control Panel—Airplanes With Zero Rail Rocket Installation

(4) Turn "ON" generator-disconnect switch. (See figure 4-item 66.) If external power supply is not used, turn "ON" battery-disconnect switch. (See figure 4-item 65.)

(5) Open throttle one inch (early airplanes) or to "START" position (late airplanes). (See figure 19.)

(6) Move propeller control to full "INCREASE RPM."

(7) On early airplanes, make certain boost control, at lower left side of instrument panel, is in "AUTOMATIC." On late airplanes, see that throttle gate is safety wired.

(8) See that supercharger blower switch is in "AUTO."

(9) Turn oil and coolant radiator air control switches at left side of cockpit to "AUTOMATIC."

(10) Move carburetor air control, at aft end of control pedestal, to "RAM AIR." ("UNRAMMED FILTERED AIR," or "UNRAMMED HOT AIR," if required.)

(11) Turn "ON" fuel shut-off control, adjacent to the fuel selector (figure 11), and turn fuel selector to "MAIN TANK L.H."

(12) Switch booster pump to "ON" (late airplanes) or "NORMAL" (early airplanes). Check booster output on fuel pressure gage: 10-14 pounds per square inch, "ON"; 8-12 pounds per square inch, "NORMAL."

(13) *Electric prime:* three to four seconds when cold, one when hot (late airplanes). *Hand prime:* three to four strokes when cold, one when hot (early airplanes).

(14) Make sure propeller is clear.

(15) Turn ignition switch to "BOTH."

(16) Lift guard on starter switch, and press switch to "START."

Note

Whenever possible, use an external power supply to start the engine. Use airplane's battery in an emergency only.

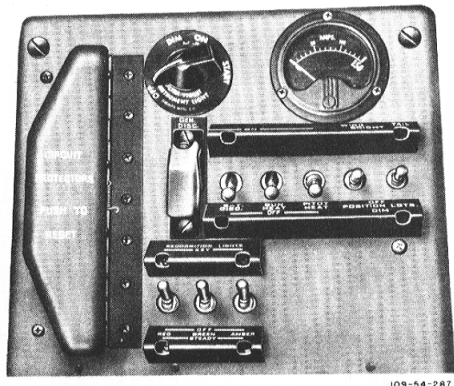


Figure 15—Right Switch Panel

(17) As engine starts, move mixture control to "AUTO RICH" or "RUN." If engine does not start after several turns, continue priming.

CAUTION

Leave mixture control in "IDLE CUT OFF" until engine fires. After firing, if engine does not start, move mixture control back to "IDLE CUT OFF" position.

(18) Check oil pressure. If pressure is not up to 50 pounds within 30 seconds, stop engine and investigate.

5. WARM-UP AND GROUND TEST.

CAUTION

During ground check, do not run up engine with surface controls in a locked position.

a. Warm up the engine at 1300 rpm until the oil temperature shows a definite increase and the oil pressure remains steady when the throttle is opened. The desired oil and coolant temperatures will be maintained by having the radiator air controls in "AUTOMATIC."

If coolant and oil temperatures exceed limits with controls in "AUTOMATIC," shut engine off and investigate.

b. Keep the flight indicator uncaged at all times except during maneuvers which exceed operating limits.

Note

If horizon bar on flight indicator is not level after engine is started, cage gyro momentarily.

c. After the engine has been warmed up sufficiently, proceed with these tests:

(1) Check both left and right main, and fuselage fuel systems by rotating fuel selector with booster pump switch in "ON" or "EMERGENCY." Check fuel pressure within limits. If combat tanks are installed, momentarily switch to each combat tank position several times to permit air trapped in the combat tank lines to bleed into the main system. Then check each position for smooth operation of the engine.

(2) Check operation of wing flaps.

(3) Check operation of radiator air outlet flaps (with assistance of outside observer) using override positions of radiator air control switches. Return switches to "AUTOMATIC."

(4) Check communication equipment for proper operation.

(5) At 2300 rpm, check the following:

Suction	3.75-4.25 in. Hg
Hydraulic pressure	800-1100 lbs./sq. in.
Ammeter	100 amperes maximum

(6) Check the instruments for desired ranges.



Figure 16—Radiator Air Control Panel

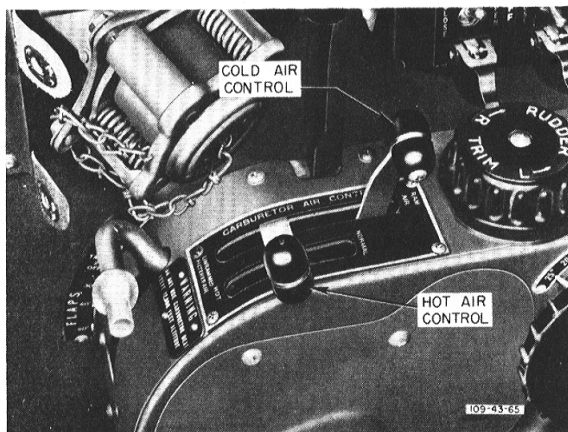


Figure 17—Carburetor Air Controls—Late Airplanes

(7) With propeller control in full "INCREASE RPM," set throttle control to obtain 2300 rpm. Move propeller control back to note maximum drop of 300 rpm. Then move forward to full "INCREASE RPM."

(8) Check supercharger operation: With propeller control at full "INCREASE RPM," engine speed 2300 rpm, hold supercharger switch in "HIGH." Note rpm drop (at least 50 rpm).

(9) With propeller control in full "INCREASE RPM" and engine speed 2300 rpm, check each magneto. Maximum allowable drop in rpm is 100 on right magneto and 130 on left magneto.

(10) Pull throttle control back to idle engine.

(11) Have ground personnel release tail, remove wheel chocks, and disconnect external power supply.

(12) If battery-disconnect switch was "OFF" (while using external power supply), turn it "ON" now.

6. SCRAMBLE TAKE-OFF.

Use oil dilution (3 minutes maximum) to obtain proper oil pressure at moderate power, and as soon as the engine will take the throttle, taxi out, and take off.

Note

Overdilution is likely to result under these conditions because of low oil flow and a cold engine, which holds back evaporation. If dilution is used, observe the oil pressure closely during the time of dilution and take-off to determine whether or not the oil has been overdiluted. Overdilution will cause low oil pressure, and loss of oil through the engine breathers.

7. TAXIING INSTRUCTIONS.

- a. Raise the wing flaps, to prevent damage to them.

CAUTION

Taxi cautiously, to avoid damage from objects which the tires might pick up and throw against the radiator air outlet flaps.



- b. Steer a zigzag course to obtain an unobstructed view.

c. Taxi with the stick slightly aft of neutral to lock the tail wheel. In the locked position, the tail wheel may be turned 6 degrees to the right or left with the rudder pedals. For sharp turns, push the stick forward of the neutral position to allow the tail wheel full-swiveling action.

- d. Use the brakes as little as possible.

e. Upon reaching the take-off position, stop the airplane at right angles to the runway so that approaching airplanes may be plainly seen.

8. BEFORE TAKE-OFF.

a. Trim airplane as follows: Rudder trim, 5 degrees right; aileron trim, 0 degrees; metal elevator trim, 26 percent aft CG —2 degrees "NH," 31 percent aft CG —4 degrees "NH"; fabric elevator trim, 26 percent aft CG —2 degrees "TH," 31 percent aft CG —0 degrees.

b. Check flying controls for free movement (look at control surfaces).

- c. Check fuel levels.

d. See that fuel selector is set on "MAIN TANK L.H.," and that booster pump switch is in "ON" or "EMERGENCY".

- e. Generator-disconnect switch "ON."

- f. Mixture control "AUTO RICH" or "RUN."

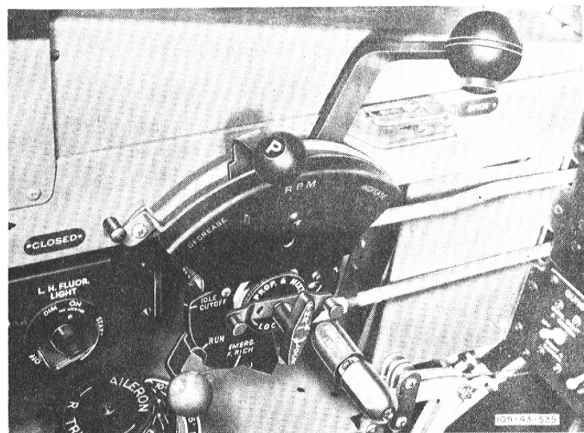


Figure 18—Engine and Propeller Controls—
Early Airplanes

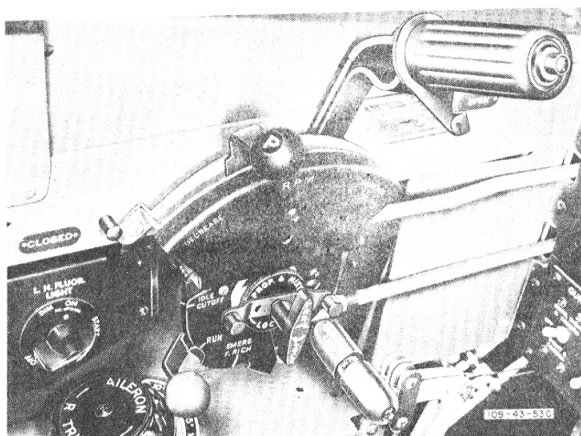


Figure 19—Engine and Propeller Controls—
Late Airplanes

- g. Propeller control at full "INCREASE RPM."
- h. Supercharger blower switch "AUTO."
- i. Oil and coolant radiator air controls "AUTOMATIC."
- j. Boost control "AUTOMATIC" (early airplanes only).
- k. Carburetor air control "RAM AIR." ("UNRAMMED FILTERED AIR" or "UNRAMMED HOT AIR," if required.)
- l. See that cockpit enclosure is locked and that emergency release handle is safetied.
- m. If it is necessary to wait at the take-off position for a long period, recheck the magnetos at 2500 rpm with the

propeller control at full "INCREASE RPM."

9. TAKE-OFF.

- a. Make sure take-off area is clear.
- b. Wing flaps 15 to 20 degrees down for best obstacle clearance.
- c. Oil pressure within limits.
- d. Oil temperature within limits.
- e. Coolant temperature within limits.

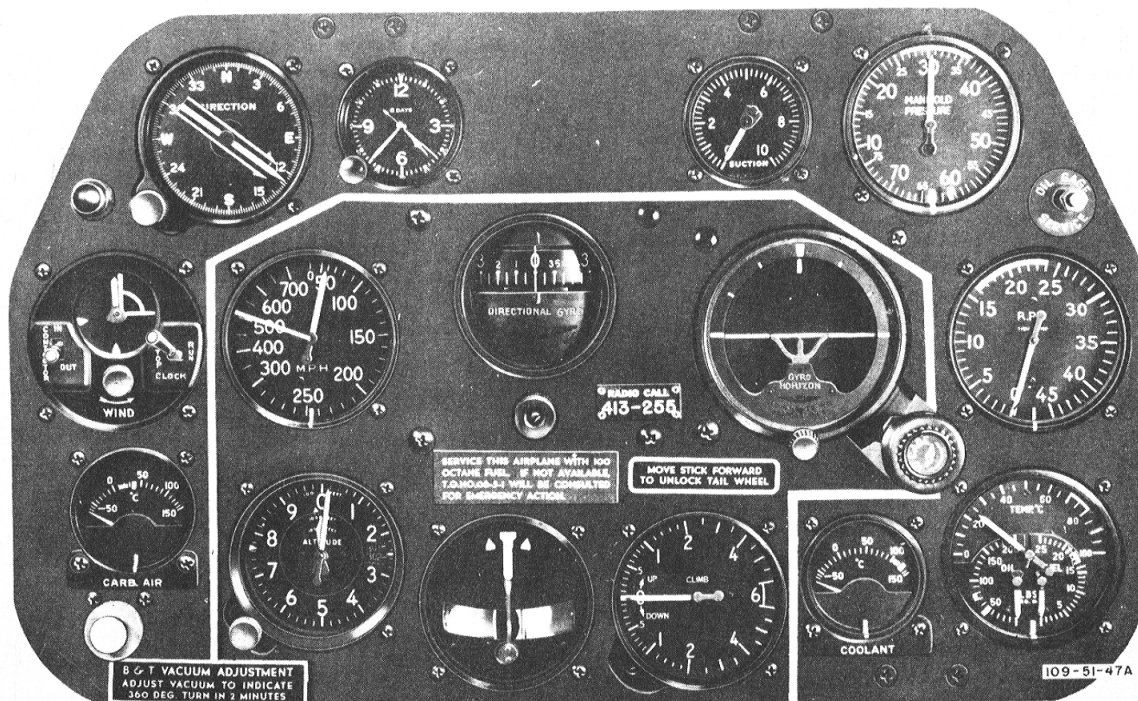


Figure 20—Instrument Panel—Early Airplanes

f. Open throttle to gate—61 in. Hg at 3000 rpm (5 minutes maximum), and take off.

Note

It is recommended that 61 in. Hg and 3000 rpm be used for all take-offs and that this power setting be reached as quickly as possible after starting the take-off run.

g. Do not attempt to lift the tail too soon, as this increases the torque action. Pushing the stick forward unlocks the tail wheel, thereby making steering difficult. The best take-off procedure is to hold the tail down until sufficient speed is attained, and then raise the tail slowly.

TAKE-OFF SPEEDS

9,000 lbs. (no external load)	95 IAS
10,000 lbs. (external load)	103 IAS
11,000 lbs. (external load)	110 IAS

See Take-off, Climb, and Landing Charts for further information.

10. ENGINE FAILURE DURING TAKE-OFF.

a. The chances of engine failure during take-off can be greatly reduced if the engine is run up carefully and checked thoroughly beforehand.

b. The hazards due to engine failure during take-off can be minimized by observing the following practices:

(1) Retract the landing gear as soon as the airplane is definitely airborne.

(2) Raise the flaps as soon as the airplane reaches a safe altitude.

c. If the engine fails immediately after take-off, act quickly as follows:

(1) Depress the nose at once so that the airspeed does not drop below stalling speed.

(2) If external fuel tanks or bombs are installed, release them immediately.

(3) Release the sliding canopy by pulling the emergency release handle on top of the longeron, at the right of the instrument panel.



WARNING

Before emergency release of canopy in flight, drop seat and lower head as far as possible. If excessive force was used in securing the canopy prior to take-off, it may be necessary to crank the canopy back enough to relieve the pressure against the windshield before the emergency release will be effective.

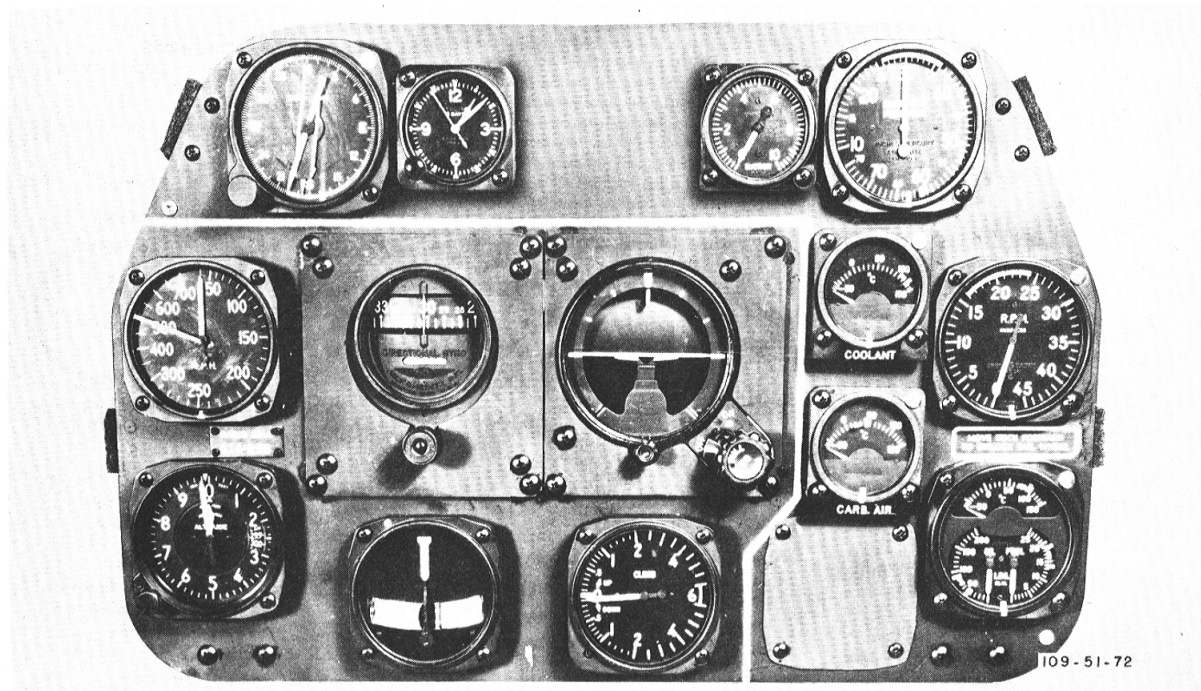


Figure 21—Instrument Panel—Late Airplanes

(4) When a reasonable doubt exists as to the condition of the terrain on which you are being forced to land, or if there is a probability of the airplane nosing over or over-running the available landing area, retract the landing gear.

(5) Lower the flaps fully, if possible.

(6) Move mixture control to "IDLE CUT OFF" and turn ignition switch "OFF."

(7) Turn fuel shut-off control "OFF."

(8) Turn battery-disconnect switch "OFF."

(9) Land straight ahead, only changing directions sufficiently to miss obstructions.

(10) After landing, get out of the airplane as quickly as possible and remain outside.

11. CLIMB.

a. As soon as the airplane is sufficiently clear of the ground, proceed as follows:

(1) Pull the landing gear control handle inboard and up to retract the gear. Check position of gear by warning lights at left of instrument panel.

WARNING

Do not apply brakes after take-off to stop rotation of wheels, as brake discs may seize.

(2) Raise the flaps by pulling flap control to the full up position when sufficient airspeed is attained and all obstacles are cleared. No sink is noticeable when the flaps are raised.

(3) Check the coolant and oil temperatures, and the oil pressure.

Note

As the rate of climb can vary widely, depending on weight carried, external loading, and altitude, refer to Take-off, Climb, and Landing Charts for the rate of climb applicable to the particular mission to be conducted.

12. DURING FLIGHT.

a. GENERAL.

(1) As soon as desired altitude is attained, turn booster pump switch to "NORMAL" (early airplanes only).

CAUTION

Keep booster pump "ON" (late airplanes) or "NORMAL" (early airplanes) at all times during flight.

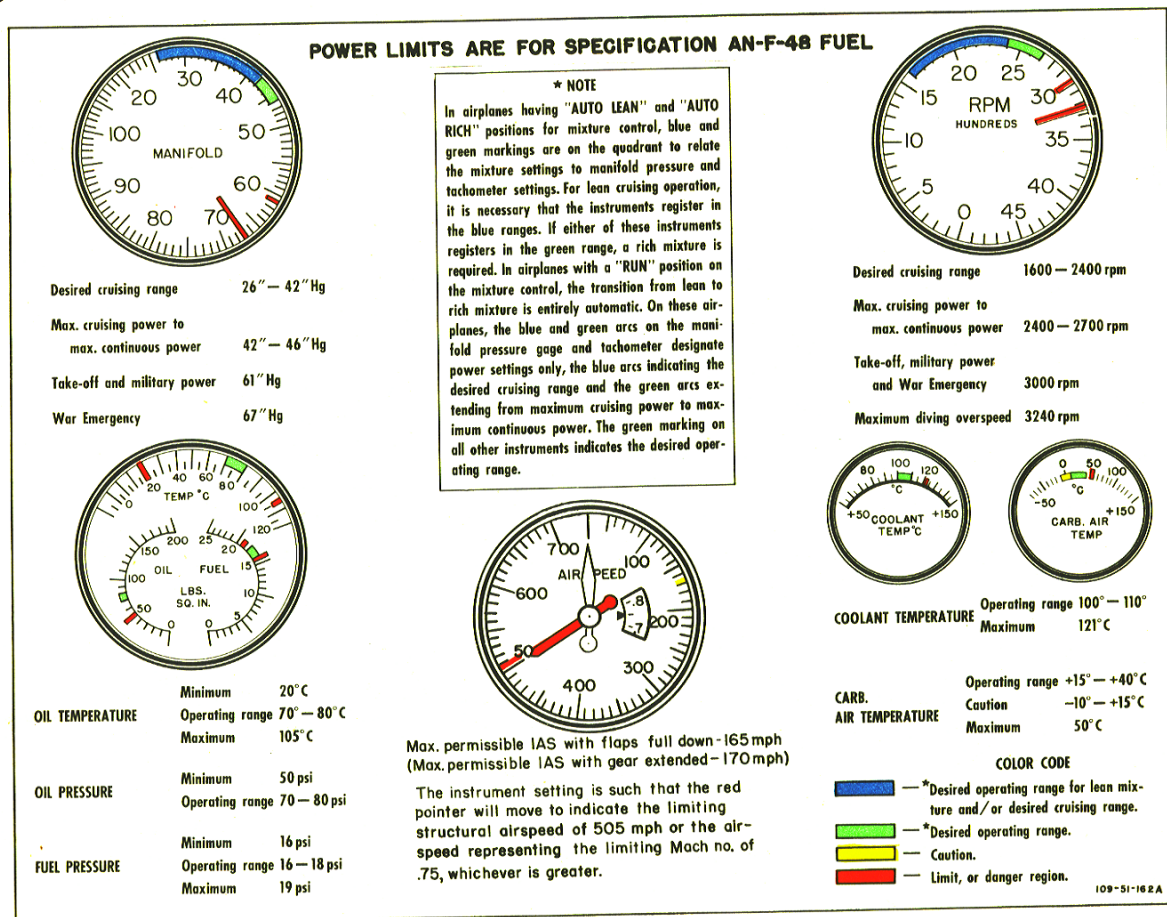


Figure 22—Instrument Limitations

(2) Set throttle and propeller controls to desired manifold pressure and rpm.

(3) Periodically check for the desired instrument readings.

Note

With the radiator air controls set in the "AUTOMATIC" position, the coolant temperature will be approximately 100°-110°C and the oil temperature will be approximately 70°-80°C. It should be noted that with very high powers on hot days, even though the radiator air controls are in the "AUTOMATIC" position, these temperature limits may be exceeded because the outlet flaps are in the full open position, making it impossible for the automatic control to maintain the desired temperature limits.

(4) For engine operation, see Power Plant Chart, section III, and Flight Operation Instruction Charts, appendix I.

Note

To ensure the lowest fuel consumption on a long-range mission, it is recommended that the highest manifold pressure consistent with Flight Operation Instruction Charts be used with any given rpm setting. However, to minimize lead fouling of spark plugs consequent to prolonged cruising at low power (especially in the range from 1600 to 1900 rpm), it is also recommended that a high power (3000 rpm and 61 in. Hg) be used for one minute every 30 minutes when the fuel supply is adequate.

WARNING

Do not use carburetor heat on V-1650-3 and V-1650-7 engines at altitudes above 12,000 feet. This precaution is necessary because heat has an adverse (leaning) effect on the carburetor altitude compensator mechanism above this altitude.

b. WAR EMERGENCY RATING.**(1) GENERAL.**

(a) The War Emergency Rating given on the Power Plant Charts has been established to make available in combat the absolute maximum manifold pressure at which

Figure 23 deleted in revision dated 17 December 1947.

Figure 23—Engine and Airplane Limitations

the engine may be operated, within reasonable safety limits, for a 5-minute period under emergency conditions.

(b) This rating is considerably higher than the ratings given in the engine specification under which the engine was delivered. Since its use will decrease the engine's normal service life and time between overhauls, the War Emergency Rating should be held for use *only when emergency conditions exist*. The War Emergency Rating is not a guaranteed power rating; it is a maximum manifold pressure rating as established by the correct setting of the automatic manifold pressure regulator and the correct setting of the propeller governor to allow the propeller to turn at 3000 rpm.

(c) Use of the War Emergency Rating is permissible only when the following requirements are fulfilled:

1. The airplane must be in combat or precombat areas, as designated by the AAF



2. Specification No. AN-F-48, Grade 100/130 fuel must be used.

3. KLG RC5/3, Lodge RS5/5, or AC LE-44 spark plugs must be installed.

4. A break-through seal must be installed on the emergency boost control (early airplanes) or at the gate (late airplanes) to inform the crew chief that the engine has been operated at War Emergency Rating.

Note

Entry shall be made on Form 1A of time of war emergency power operation for close coordination with ground engineering officer.

5. The airplane must be placarded with a decal stating that use of the War Emergency Rating is permitted.

(2) OPERATION.—If it is necessary to use the War Emergency Rating, proceed as follows:

(a) Check mixture control. On late airplanes, the mixture control will be in "RUN"; on early airplanes, the mixture control will be in "AUTO RICH."

(b) Move propeller control to full "INCREASE RPM."

(c) Advance throttle to full open position (beyond gate on late airplanes).

(d) Pull out on boost control lever (early airplanes).

(e) Use war emergency power for 5 minutes maximum. Do not permit coolant outlet temperature to exceed 121°C. Oil inlet temperature must not exceed 105°C.

CAUTION

If the oil has been diluted, it is desirable to operate the engine 10 to 15 minutes at from 80 percent normal to military power before using the War Emergency Rating.

(f) To return to normal power operations:

1. Push boost control lever in (early airplanes).

2. Set throttle and propeller controls to give desired manifold pressure and rpm.

13. ENGINE FAILURE DURING FLIGHT.

Follow instructions in section IV, paragraph 3.

14. FLYING CHARACTERISTICS.

a. GENERAL.—The airplane is stable at all normal loadings, but the directional trim changes at low speeds as speed and horsepower output are varied. The trim tab controls are sensitive and must be used carefully. The effect of flap and landing gear operation on the trim of the airplane in flight is as follows:

Landing gear extended—airplane becomes nose heavy.
Flaps lowered—airplane becomes nose heavy.

b. CHARACTERISTICS OF ELEVATOR BOBWEIGHT.—With the fuselage tank filled, the center of gravity of the airplane is moved so far aft that flying characteristics become unsatisfactory. Stick forces tend to reverse when the airplane enters a tight turn or pull-out, making it necessary for the pilot to exert considerable forward pressure on the stick to prevent further tightening of the turn or pull-out. In order to reduce this tendency, a bobweight has been added to the elevator system to increase the normal stick forces under accelerated flight conditions. When not more than 25 gallons remain in the fuselage fuel tank, combat maneuvers may be made without as great a danger of overaccelerating the airplane due to low stick forces. However, with the fuselage tank full, it is still necessary to exercise extreme care in flying and to avoid accelerated flight. Keep in mind that the restrictions given in paragraph 1. a. still apply.

15. STALLS.

The stall in this airplane is comparatively mild. The airplane does not whip at the stall but rolls rather slowly, and has very little tendency to drop into a spin. When the stick and rudder are released, the nose drops sharply, and the airplane recovers from the stall almost instantly. When a complete stall is reached, a wing will drop. If you keep pulling back on the stick when the wing drops, the airplane will fall into a steep spiral. In a straight power-off stall, some warning

is given about 3 to 4 mph above the stall by slightly elevator buffet. A high-speed stall is preceded by sharp buffeting at the elevators and wing root, but recovery is almost immediate when pressure on the stick is released. Recovery from any stall is entirely normal: Release the back pressure on the stick and apply opposite rudder to pick up the dropping wing. The speed at which a stall occurs can vary widely, depending on the gross weight and external load of the airplane.

STALLING SPEEDS

With or Without Wing Racks (No External Load)

GEAR AND FLAPS UP

Gross Weight	9500	8500	7500
IAS (mph)	103	97	91

GEAR AND FLAPS DOWN

Gross Weight	9500	8500	7500
IAS (mph)	96	90.5	85

With Wing Bombs or Combat Tanks

GEAR AND FLAPS UP

Gross Weight	11,000	10,000	9000
IAS (mph)	113	107.5	102

GEAR AND FLAPS DOWN

Gross Weight	11,000	10,000	9000
IAS (mph)	103	98	93

16. SPINS.

a. POWER-OFF SPINS. (See figure 24.)

(1) DESCRIPTION.

(a) In general, spins in this airplane are uncomfortable due to heavy oscillations. Occasionally the left spin will dampen out after approximately three turns, but the right spin continues with an oscillatory action.

(b) Upon applying controls to start a spin, the airplane snaps $\frac{1}{2}$ turn in the direction of spin with the nose dropping to near vertical. At the end of one turn, the nose rises to or above the horizon and the spin slows down, occasionally coming almost to a complete stop. The airplane then snaps $\frac{1}{2}$ turn with the nose dropping to 50-60 degrees below the horizon and continues as during the first turn.

(c) The force required to hold the controls in the spinning position is quite heavy and some rudder buffet will be noticed.

(d) Upon applying controls for recovery, the nose drops to near the vertical position, the spin speeds up, then stops in 1 to $1\frac{1}{4}$ turns after recovery controls have been applied.

(2) RECOVERY.—Recovery procedure is the same in both a left and right spin. As soon as you apply opposite rudder, the nose will drop slightly. The spin will speed up rapidly for about $1\frac{1}{4}$ turns and then stop. The rudder force will be light at first, become very heavy for about one second in the first half turn, and then drop to zero as the spin stops. Recovery is effected in the normal manner, that is, by applying full opposite rudder followed by movement of the stick to neutral.



109-00-287A

Figure 24—Spin Characteristics

Note

During the spin, a slight rudder buffeting will be noticeable. If you attempt to recover from the dive too soon after the spin has stopped, you will also feel a rather heavy buffeting in both the elevator and rudder. The remedy for this condition is to release some of the pressure you have applied on the stick.

b. POWER-ON SPINS.

(1) **DESCRIPTION.**—Power-on spins are extremely dangerous in this airplane and should never be intentionally performed. In a power-on spin, the nose of the airplane remains 10-20 degrees above the horizon and recovery control has no effect upon the airplane until the throttle has been completely retarded.

(2) **RECOVERY.**—Close throttle completely and apply controls for recovery. Hold full opposite rudder with stick in neutral until recovery is effected. As many as 5 or 6 turns of spin will be made after applying controls for recovery and 9000-10,000 feet of altitude will be lost.

17. PERMISSIBLE ACROBATICS.

All acrobatics are permitted, with the exception of snap rolls and power-on spins. Slow rolls are permitted only if the airplane is equipped with a dorsal fin and reverse boost rudder tab. Inverted flying must be limited to 10 seconds because of loss of oil pressure and failure of the scavenge pumps to operate in an inverted position.

18. DIVING.

a. MAXIMUM DIVING SPEEDS.

(1) **GENERAL.**—At high diving speeds there is danger of the airplane being affected by compressibility—a phenomenon likely to be encountered when the true speed approaches the speed of sound. Compressibility may be indicated by instability of the airplane, uncontrollable rolling or pitching, stiffness of controls, or combinations of these effects. The high-speed dive characteristics of the airplane depend to some extent on the elevator installation. Late airplanes are equipped with metal-covered elevators and a vertical stabilizer with an angle of incidence of $\frac{1}{2}$ degree; all other airplanes have fabric-covered elevators and a vertical stabilizer with an angle of incidence of 2 degrees.

(2) **FABRIC-COVERED ELEVATORS.**—At a true speed of approximately 75 percent of the speed of sound, airplanes with fabric-covered elevators tend to porpoise. This porpoising starts at approximately the speeds shown in red on figures 26 and 27 and increases in intensity as the airspeed is further increased. Although the airplane does not exhibit any unusual characteristics other than porpoising at the indicated speeds, these limits should not normally be exceeded, since compressibility effects may be evidenced in a more violent manner if allowed to progress. Figures 26 and 27 show the pilot's indicated airspeed corresponding to a true speed of 75 percent of the speed of sound at various altitudes. Note, however, that at the lower altitudes, the speed of sound does

not govern, and the limiting speed becomes a structural consideration only.

(3) **METAL-COVERED ELEVATORS.**—With the metal-covered elevators installed, the longitudinal characteristics remain normal until the true speed of the airplane reaches approximately 76 to 78 percent of the speed of sound. At this speed, the airplane may become slightly nose-heavy because of the effects of compressibility. Inasmuch as further increases in true speed may result in more severe nose-heaviness, diving speed should be limited at this point and recovery started immediately after the change in trim is evident.

b. ALTITUDE REQUIRED FOR PULL-OUT.—Figure 26 shows the minimum safe altitude required for a pull-out from dives, with a constant 4G acceleration. Figure 27 shows the minimum safe altitude required for a pull-out from dives with a constant 6G acceleration (when using anti-G suit).

c. RECOVERY.—If, through necessity or inadvertence, you exceed the diving speed limits shown on figure 26 and pronounced compressibility effects are experienced, ease off on your power and pull up gradually.



WARNING

Be very careful in pull-outs, since the stick forces are relatively light, and an abrupt pull-out may cause structural failure.

The elevator trim tab will normally not be required to aid recovery. However, if found necessary, it should be used with care and in small increments.

19. GLIDING.

Gliding may be carried out at any safe speed down to the recommended margin of about 25 percent above stalling speed. With the landing gear and flaps up, the glide is fairly flat with the nose very high. Forward visibility in this condition is poor. Lowering either the flaps or landing gear, or both, greatly steepens the gliding angle, and the rate of descent is considerably increased.

20. NIGHT FLYING.**Note**

On early airplanes, spare bulbs are contained in the small compartment on the right forward side of the cockpit. Disconnect oxygen hose before opening compartment door. On late airplanes, spare bulbs are in clips on the left underside of the instrument shroud.

a. In flying at night, the sequence outlined for daylight operation should be even more strictly observed. In addition, familiarize yourself with the location of the different lights and their control switches, especially the landing light switch.

(1) **INSTRUMENT LIGHTING.**—Turn on the fluorescent lamps by turning the rheostat knobs (on radiator air control panel and right-hand switch panel) to "START" until the lights come on; then switch to either "ON" or "DIM" position. Rotating the lens housing selects the visible or invisible illumination.

(2) **POSITION LIGHTS.**—The position light switches are on the right-hand switch panel. Two intensities of light are available: "BRIGHT" and "DIM."

(3) **LANDING LIGHT.**—The switch for the landing light is located on the radiator air control panel.

(4) **COCKPIT LIGHTS.**—A cockpit swivel light is on each side of the cockpit. Turn on light by turning switch on lamp housing. The cockpit light switch on the front switch panel must be "ON" before operating the lights.

(5) **RECOGNITION LIGHTS.**—Set the switches, located on the right switch panel, for the light or combination of lights desired. Place the switches in "STEADY" position for continuous operation and in "KEY" position for intermittent operation, using the keying switch.

21. APPROACH AND LANDING.

(Recommended landing speeds are shown in figure 28.)

a. **APPROACH.**—When approaching the field, follow this sequence:

Note

It is recommended that military power be used for a short period just prior to landing.

- (1) Mixture control "AUTO RICH" or "RUN."
- (2) Oil and coolant radiator air controls "AUTOMATIC."
- (3) Fuel selector to internal tank with most fuel. Booster pump switch "ON" or "NORMAL."
- (4) Propeller control set for 2700 rpm.

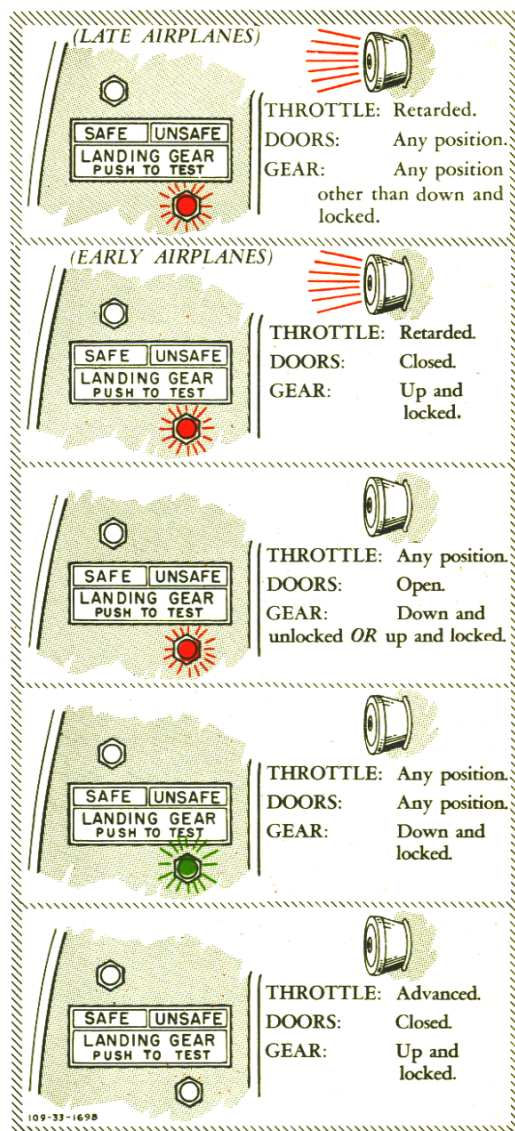


Figure 25—Landing Gear Warning Signals

(5) Lower the landing gear below 170 IAS. Check position of gear by the warning lights at left of instrument panel. On late airplanes, a horn will sound when throttle is retarded with gear up. (See figure 25.)

WARNING

After lowering landing gear, do not attempt to raise gear by moving landing gear control to "UP" until the "DOWN" cycle is completed.

(6) If desired, lower the flaps 15 degrees to give a steeper approach angle. When the airplane has been brought into the wind for landing, lower the flaps fully at an altitude of at least 400 feet, provided the indicated airspeed is below 165 IAS and above 100 IAS.

LIMITING IAS
260

285

310

340

370

400

430

465

495

505

505

MINIMUM SAFE ALTITUDE REQ. FOR RECOVERY - FEET

MINIMUM SAFE ALTITUDE REQUIRED FOR RECOVERY FROM DIVES
AT VARIOUS ANGLES WITH A CONSTANT 4G ACCELERATION

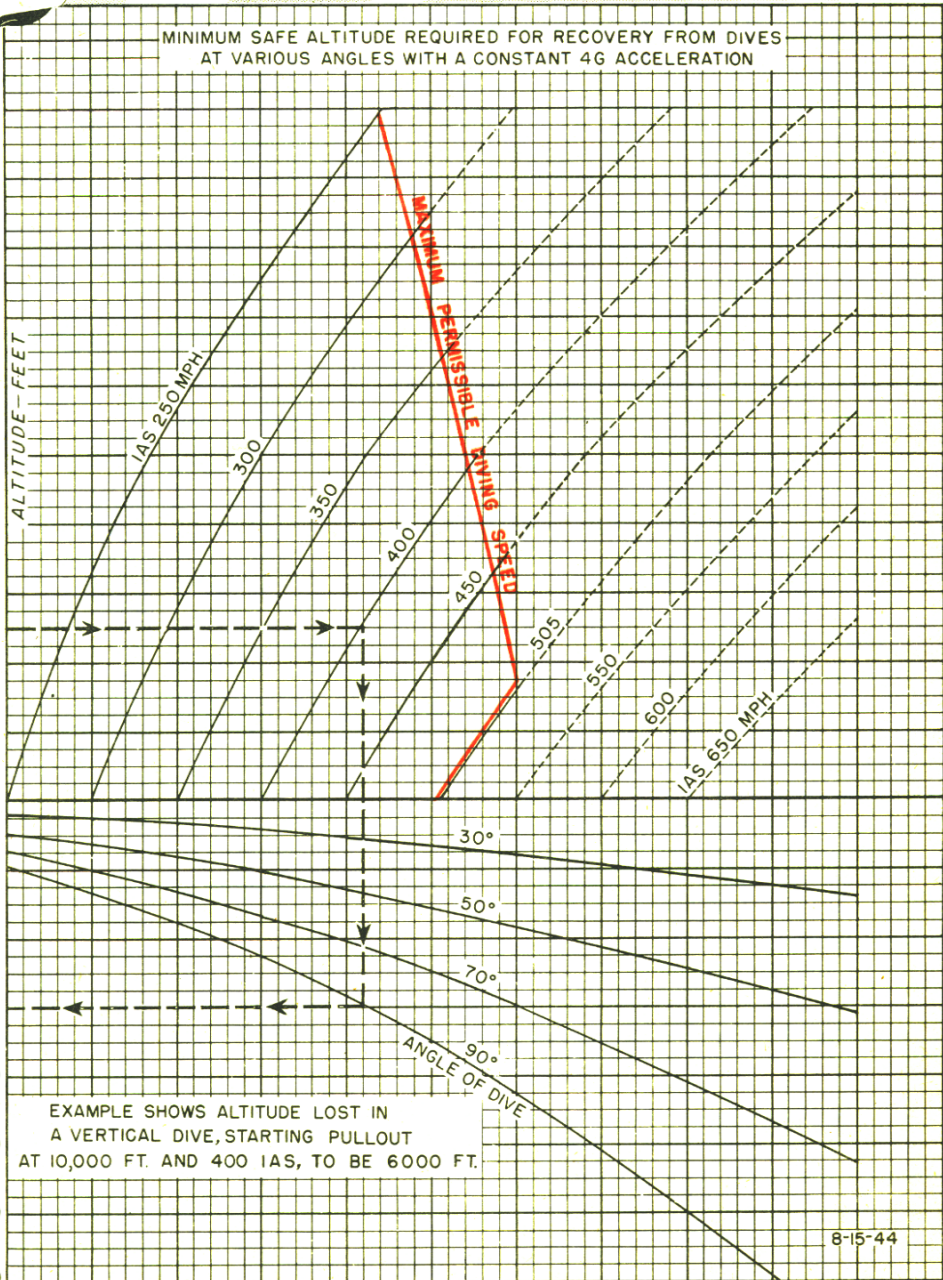


Figure 26—Diving Limitations—4G Pullout

AN 01-60JE-1

122-93-1918

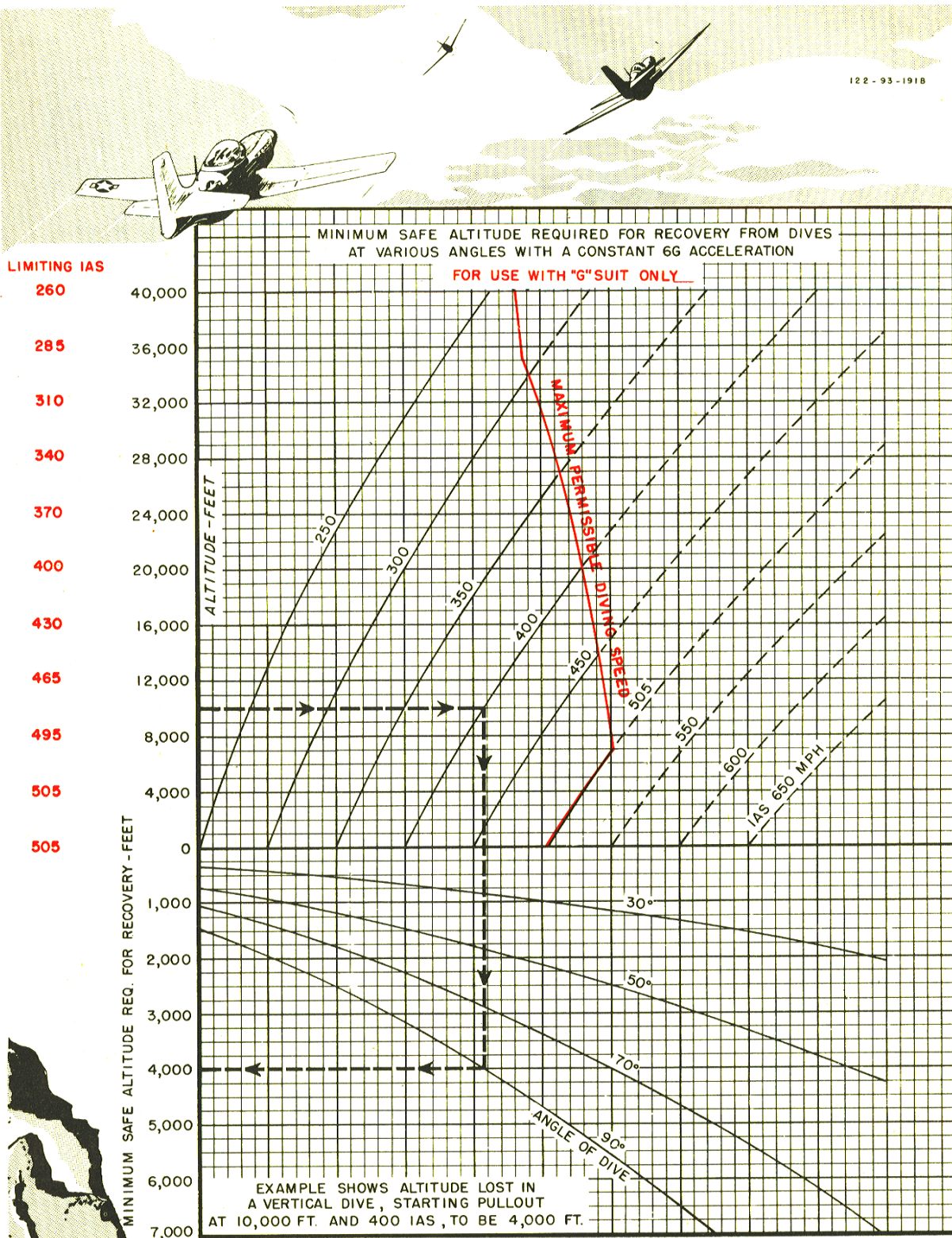


Figure 27—Diving Limitations—6G Pullout

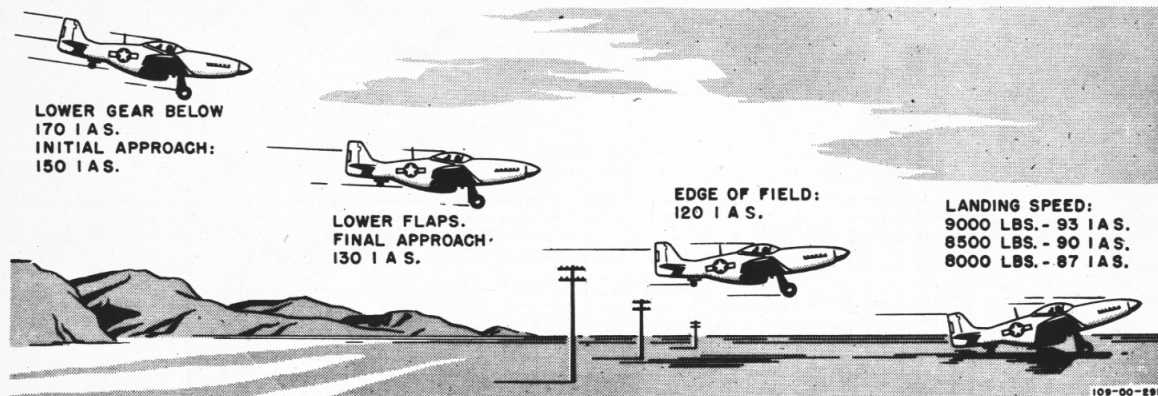


Figure 28—Approach and Landing Speeds

b. LANDING.

(1) **GENERAL.**—After you have turned into the field and lowered the flaps, maintain a correct gliding speed. Adjust the elevator trim tab to assist in landing. Having stopped after landing, raise the flaps before taxiing.

(2) **CROSS-WIND LANDING.**—As the airplane has a landing gear of wide tread and a steerable tail wheel, cross-wind landings may be negotiated safely. Keep one wing down, into the wind, to counteract drift.

(3) MINIMUM RUN LANDING.

(a) For a minimum run landing over an obstacle, lower the flaps fully and reduce power to obtain the lowest IAS consistent with safety.

(b) For a minimum run landing with no obstacle, use full flaps and make a flat, power-on approach.

(4) **GO-AROUND PROCEDURE.**—If an attempt to land is unsuccessful:

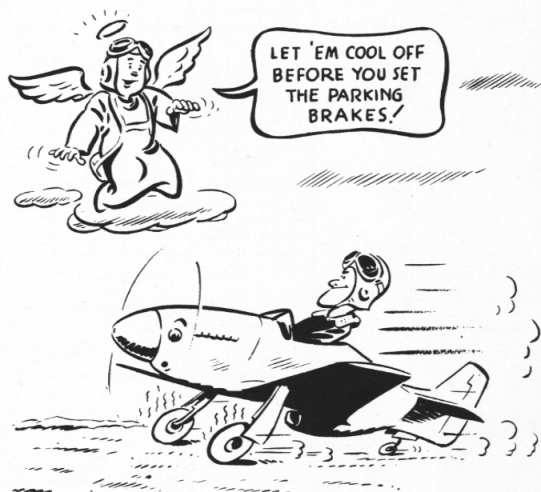
- (a) Open throttle.
- (b) Push propeller control to full "INCREASE RPM."
- (c) Raise landing gear.
- (d) When airspeed reaches 100 IAS, raise flaps.

22. STOPPING ENGINE.

- a. Turn booster pump switch "OFF."
- b. If a cold weather start is anticipated, hold oil dilution switch "ON" (3 minutes maximum).
- c. Run engine to 1500 rpm, set mixture control in "IDLE CUT OFF," and move throttle fully open. Leave mixture control in "IDLE CUT OFF" as a precaution against accidental starting.
- d. Turn ignition switch "OFF" after the engine ceases firing.
- e. Turn fuel shut-off control "OFF."

23. BEFORE LEAVING COCKPIT.

- a. Turn "OFF" all switches.
- b. Release parking brakes after wheels are chocked. ■
- c. Lock the control surfaces. (Use upper locking notch on control stick when airplane is to be towed.) (See figure 7.)
- d. Place carburetor air control in "UNRAMMED FILTERED AIR" position.



- e. Open canopy, and pull crank handle inboard to disengage clutch, so that canopy can be moved manually. (See figure 10.)
- f. Close canopy after leaving cockpit.

Section III

OPERATING DATA



1. AIRSPEED CORRECTION TABLES.

a. Two corrections must be made on the IAS in order to obtain the true indicated airspeed. The first correction is for the pitot installation; the second is for compressibility effects. Use the Airspeed Installation Correction Table to find the corrected indicated airspeed; then use the Com-

pressibility Correction Table to obtain the true indicated airspeed.

b. EXAMPLE.

(1) PROBLEM.—Find true indicated airspeed from an IAS of 400 at 25,000 feet.

(2) ANSWER.—Corrected IAS = $400 + 4$ (position error) or 404. True indicated airspeed = 404 less 19 or 385.

AIRSPEED INSTALLATION CORRECTION TABLE
(With or Without External Load)

FLAPS UP		FLAPS FULL DOWN	
IAS (mph)	CORRECTION	IAS (mph)	CORRECTION
100	Add 5 mph	90	Add 3 mph
150	Add 4 mph	100	Add 1 mph
200	Add 3 mph	110	Subtract 1 mph
250	Add 2 mph	120	Subtract 2 mph
300	Add 2 mph	130	Subtract 3 mph
350	Add 3 mph		
400	Add 4 mph		

COMPRESSIBILITY CORRECTION TABLE

Subtract From Corrected Indicated Airspeed							
Pressure Altitude	IAS (mph)						
	150	200	250	300	350	400	500
10,000	0	1	2	3	4	6	10
15,000	0	1	3	4	7	10	17
20,000	1	2	4	6	10	14	25
25,000	1	3	5	9	13	19	33
30,000	2	4	7	12	19	25	42
35,000	2	5	10	16	25	33	53

POWER PLANT CHART

AIRCRAFT MODEL(S)

PROPELLER(S)

ENGINE MODEL(S)

P-51D AND P-51K

HAMILTON STANDARD

V-1650-7

GAUGE READING	FUEL PRESS.	OIL PRESS.	OIL TEMP.	COOLANT TEMP.	CARB. AIR TEMP.	MAXIMUM PERMISSABLE DIVING RPM: 3240 MINIMUM RECOMMENDED CRUISE RPM: 1600								
DESIRED MAXIMUM	16-18 19	70-80	70-80	100-110 105	15-40 50	OIL GRADE: 1120, SPEC. NO. AN-O-8 FUEL GRADE: 100/130 SPEC. NO. AN-F-48 COOLANT: SPEC. NO. AN-E-2 WITH NMBT								
MINIMUM IDLING	16 9	50 15												

WAR EMERGENCY (COMBAT EMERGENCY)			MILITARY POWER (NON-COMBAT EMERGENCY)			OPERATING CONDITION		NORMAL RATED (MAXIMUM CONTINUOUS)			MAXIMUM CRUISE (NORMAL OPERATION)			
5 MINUTES			15 MINUTES			TIME LIMIT		UNLIMITED			UNLIMITED			
RUN 3000			RUN 3000			MIXTURE R. P. M.		RUN 2700			RUN 2400			
MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽²⁾ Gal./Min	MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽²⁾ Gal./Min	STD. TEMP. °C	PRESSURE ALTITUDE	STD. TEMP. °F	MANIF. PRESS.	SUPER- CHARGER	FUEL GPH ⁽³⁾	MANIF. PRESS.	SUPER- CHARGER	FUEL GPH ⁽³⁾
F.T.	HIGH	1.0	F.T.	HIGH	1.0	-55.0	40,000 FT.	-67.0	F.T.	HIGH	63	F.T.	HIGH	49
F.T.	HIGH	1.5	F.T.	HIGH	1.5	-55.0	38,000 FT.	-67.0	F.T.	HIGH	70	F.T.	HIGH	54
F.T.	HIGH	1.5	F.T.	HIGH	1.5	-55.0	36,000 FT.	-67.0	F.T.	HIGH	77	F.T.	HIGH	59
F.T.	HIGH	2.0	F.T.	HIGH	2.0	-52.4	34,000 FT.	-62.3	F.T.	HIGH	84	F.T.	HIGH	63
F.T.	HIGH	2.0	F.T.	HIGH	2.0	-48.4	32,000 FT.	-55.1	F.T.	HIGH	90	F.T.	HIGH	68
F.T.	HIGH	2.5	F.T.	HIGH	2.5	-44.4	30,000 FT.	-48.0	F.T.	HIGH	97	F.T.	HIGH	72
F.T.	HIGH	3.0	F.T.	HIGH	3.0	-40.5	28,000 FT.	-40.9	46	HIGH	101	F.T.	HIGH	77
F.T.	HIGH	3.5	61	HIGH	3.0	-36.5	26,000 FT.	-33.7	46	HIGH	99	F.T.	HIGH	82
67	HIGH	3.5	61	HIGH	3.0	-32.5	24,000 FT.	-26.5	46	HIGH	97	42	HIGH	84
67	HIGH	3.5	61	HIGH	3.0	-28.6	22,000 FT.	-19.4	46	HIGH	95	42	HIGH	83
67	HIGH	3.5	61	HIGH	3.0	-24.6	20,000 FT.	-12.3	F.T.	LOW	94	42	HIGH	82
67	HIGH	3.5	F.T.	LOW	2.5	-20.7	18,000 FT.	-5.2	F.T.	LOW	100	42	HIGH	81
F.T.	LOW	3.5	F.T.	LOW	2.5	-16.7	16,000 FT.	2.0	46	LOW	105	F.T.	LOW	79
F.T.	LOW	3.5	F.T.	LOW	3.0	-12.7	14,000 FT.	9.1	46	LOW	102	42	LOW	84
F.T.	LOW	3.5	61	LOW	3.0	-8.8	12,000 FT.	16.2	46	LOW	99	42	LOW	82
67	LOW	2.5	61	LOW	3.0	-4.8	10,000 FT.	23.4	46	LOW	97	42	LOW	80
67	LOW	3.0	61	LOW	3.0	-0.8	8,000 FT.	30.5	46	LOW	94	42	LOW	78
67	LOW	3.5	61	LOW	3.0	3.1	6,000 FT.	37.6	46	LOW	92	42	LOW	76
67	LOW	3.5	61	LOW	3.0	7.1	4,000 FT.	44.7	46	LOW	90	42	LOW	74
67	LOW	3.5	61	LOW	2.5	11.0	2,000 FT.	51.8	46	LOW	88	42	LOW	72
67	LOW	3.0	61	LOW	2.5	15.0	SEA LEVEL	59.0	46	LOW	86	42	LOW	70

GENERAL NOTES

⁽¹⁾Gal./Min: APPROXIMATE U.S. GALLON PER MINUTE PER ENGINE⁽²⁾GPH: APPROXIMATE U.S. GALLON PER HOUR PER ENGINE.

F.T.: MEANS FULL THROTTLE OPERATION.

VALUES ARE FOR LEVEL FLIGHT WITH RAM.

FOR COMPLETE CRUISING DATA SEE APPENDIX I
 NOTE: TO DETERMINE CONSUMPTION IN BRITISH
 IMPERIAL UNITS, MULTIPLY BY 10 THEN DIVIDE
 BY 12.

TAKE-OFF CONDITIONS:

3000 RPM 61" HG

CONDITIONS TO AVOID:

OPERATION BELOW 1600 RPM LOW BLOWER
 OPERATION BELOW 2000 RPM HIGH BLOWER

SPECIAL NOTES

*AVOID OPERATION BELOW 1600 RPM IN LOW BLOWER
 AS GENERATOR WILL NOT DELIVER SUFFICIENT AMPERAGE.

*AVOID OPERATION BELOW 2000 RPM IN HIGH BLOWER
 BECAUSE OF ENGINE ROUGHNESS.

DATA AS OF 8/20/44 BASED ON FLIGHT TESTS

 AFMPC-526
 8-1-44

Figure 29—Power Plant Chart—V-1650-7 Engine

AN 01-60JE-1

POWER PLANT CHART

AIRCRAFT MODEL(S)
P-51D AND K

PROPELLER(S)
AEROPRODUCTS CONSTANT-SPEED
OR HAMILTON STANDARD

ENGINE MODEL(S)
V-1650-3

GAUGE READING	FUEL PRESS.	OIL PRESS.	OIL TEMP.	COOLANT TEMP.	CARB. AIR TEMP.	MAXIMUM MINIMUM	PERMISSIBLE RECOMMENDED	DIVING CRUISE	RPM: 3200 RPM: 1600
DESIRED MAXIMUM	16-18 19	70-80	70-80 105	100-110 121	15-40 50				
MINIMUM IDLING	16 9	50 15							

OIL GRADE: 1120, SPEC. NO. AN-O-8
FUEL GRADE: 100/130 SPEC. NO. AN-F-48
COOLANT: SPEC. NO. AN-E-2 WITH NMBT

WAR EMERGENCY (COMBAT EMERGENCY)			MILITARY POWER (NON-COMBAT EMERGENCY)			OPERATING CONDITION			NORMAL RATED (MAXIMUM CONTINUOUS)			MAXIMUM CRUISE (NORMAL OPERATION)		
5 MINUTES			15 MINUTES			TIME LIMIT			UNLIMITED			UNLIMITED		
RUN 3000			RUN 3000			MIXTURE R. P. M.			RUN 2700			RUN 2400		
MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽²⁾ Gal./Min	MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽²⁾ Gal./Min	STD. TEMP. °C	PRESSURE ALTITUDE	STD. TEMP. °F	MANIF. PRESS.	SUPER- CHARGER	FUEL GPH ⁽³⁾	MANIF. PRESS.	SUPER- CHARGER	FUEL GPH ⁽³⁾
F.T.	HIGH	2.0	F.T.	HIGH	2.0	-55.0	40,000 FT.	-67.0	F.T.	HIGH	63	F.T.	HIGH	48
F.T.	HIGH	2.0	F.T.	HIGH	2.0	-55.0	38,000 FT.	-67.0	F.T.	HIGH	74	F.T.	HIGH	56
F.T.	HIGH	2.0	F.T.	HIGH	2.0	-55.0	36,000 FT.	-67.0	F.T.	HIGH	85	F.T.	HIGH	64
F.T.	HIGH	2.5	F.T.	HIGH	2.5	-52.4	34,000 FT.	-62.3	F.T.	HIGH	96	F.T.	HIGH	70
F.T.	HIGH	2.5	F.T.	HIGH	2.5	-48.4	32,000 FT.	-55.1	46	HIGH	102	F.T.	HIGH	77
F.T.	HIGH	2.5	61	HIGH	2.5	-44.4	30,000 FT.	-48.0	46	HIGH	100	F.T.	HIGH	84
67	HIGH	3.0	61	HIGH	2.5	-40.5	28,000 FT.	-40.9	46	HIGH	98	42	HIGH	86
67	HIGH	3.0	61	HIGH	2.5	-36.5	26,000 FT.	-33.7	46	HIGH	97	42	HIGH	84
67	HIGH	3.0	F.T.	LOW	2.5	-32.5	24,000 FT.	-26.5	F.T.	LOW	99	F.T.	LOW	71
F.T.	LOW	2.5	F.T.	LOW	2.5	-28.6	22,000 FT.	-19.4	F.T.	LOW	111	F.T.	LOW	76
F.T.	LOW	2.5	F.T.	LOW	2.5	-24.6	20,000 FT.	-12.3	46	LOW	119	F.T.	LOW	83
F.†	LOW	3.0	61	LOW	3.0	-20.7	18,000 FT.	- 5.2	46	LOW	117	F.T.	LOW	91
67	LOW	3.0	61	LOW	3.0	-16.7	16,000 FT.	2.0	46	LOW	116	42	LOW	94
67	LOW	3.0	61	LOW	3.0	-12.7	14,000 FT.	9.1	46	LOW	114	42	LOW	93
67	LOW	3.0	61	LOW	3.0	- 8.8	12,000 FT.	16.2	46	LOW	112	42	LOW	92
67	LOW	3.0	61	LOW	3.0	- 4.8	10,000 FT.	23.4	46	LOW	110	42	LOW	90
67	LOW	3.0	61	LOW	2.5	- 0.8	8,000 FT.	30.5	46	LOW	109	42	LOW	88
67	LOW	3.0	61	LOW	2.5	3.1	6,000 FT.	37.6	46	LOW	107	42	LOW	86
67	LOW	3.0	61	LOW	2.5	7.1	4,000 FT.	44.7	46	LOW	105	42	LOW	85
67	LOW	3.0	61	LOW	2.5	11.0	2,000 FT.	51.8	46	LOW	103	42	LOW	83
67	LOW	3.0	61	LOW	2.5	15.0	SEA LEVEL	59.0	46	LOW	101	42	LOW	81

GENERAL NOTES

① Gal./Min: APPROXIMATE U.S. GALLON PER MINUTE PER ENGINE
② GPH: APPROXIMATE U.S. GALLON PER HOUR PER ENGINE.
F.T.: MEANS FULL THROTTLE OPERATION.
VALUES ARE FOR LEVEL FLIGHT WITH RAM.

FOR COMPLETE CRUISING DATA SEE APPENDIX I
NOTE: TO DETERMINE CONSUMPTION IN BRITISH
IMPERIAL UNITS, MULTIPLY BY 10 THEN DIVIDE
BY 12. RED FIGURES ARE PRELIMINARY SUBJECT
TO REVISION AFTER FLIGHT CHECK.

TAKE-OFF CONDITIONS:
3000 RPM 61 IN. HG

*CONDITIONS TO AVOID:
OPERATIONS BELOW 1600 RPM LOW BLOWER
OPERATIONS BELOW 2000 RPM HIGH BLOWER

SPECIAL NOTES

*AVOID OPERATION BELOW 1600 RPM IN LOW BLOWER AS
GENERATOR WILL NOT DELIVER SUFFICIENT AMPERAGE.
*AVOID OPERATION BELOW 2000 RPM IN HIGH BLOWER
BECAUSE OF ENGINE ROUGHNESS.

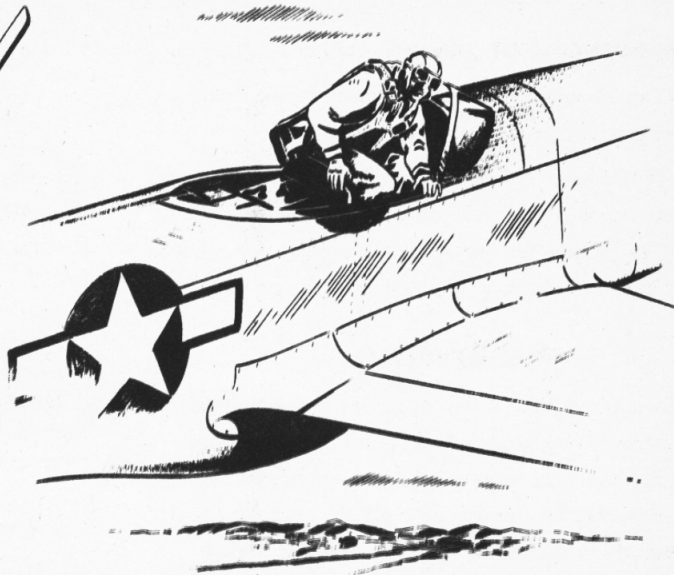
DATA AS OF 5-8-45 BASED ON FLIGHT TESTS

AFMC-526
8-1-44

Figure 30—Power Plant Chart—V-1650-3 Engine

Section IV

EMERGENCY OPERATING INSTRUCTIONS



1. GENERAL.

All emergency instructions, except those contained in section II, have been assembled in this section to facilitate quick reference. Thoroughly acquaint yourself with these instructions before flying this airplane.

2. ENGINE FAILURE DURING TAKE-OFF.

Follow instructions in section II, paragraph 10.

3. ENGINE FAILURE DURING FLIGHT.

a. If the engine fails during flight, the airplane may be abandoned, ditched (*paragraph 6*), or brought in for a dead-stick landing. For a landing with the engine dead, follow these instructions:

(1) Depress the nose at once so that the airspeed does not drop below stalling speed. Keep IAS well above stalling speed.

(2) If external tanks or bombs are installed, release them immediately. (*See paragraph 9.*)

(3) Turn "OFF" fuel shut-off control and battery-disconnect switch.

(4) Choose an area for landing. If near a landing field, notify tower. Judge your turns carefully and plan to land into the wind.

(5) Release sliding canopy by pulling emergency release handle on right longeron.

WARNING

Before emergency release of canopy in flight, drop seat and lower head as far as possible. If excessive force was used in securing canopy prior to take-off, it may be necessary to crank the canopy back

enough to relieve the pressure against the windshield before the emergency release will be effective.

(6) If a long runway is available and if there is sufficient time and altitude to properly plan an approach, lower the landing gear. *If landing under any other condition, keep the gear up*; you will stand less chance of injury by making a belly landing.

(7) Lower the flaps approximately 30 degrees, saving the last 20 degrees of flap to overcome possible mistakes in judgment. Lower flaps fully when proper landing is assured.

(8) Land into the wind, changing direction only as necessary to miss obstructions.

(9) After landing, get out of the airplane as quickly as possible and remain outside.

4. RUNAWAY PROPELLER.

a. Failure of the governor to operate properly may result in a runaway propeller. A runaway propeller goes to full low pitch and may result in an engine rpm as high as 3600 or more. When such a failure occurs, the only method of reducing the rpm is to pull the throttle back and decrease airspeed. In doing this, it is highly important to make use of the allowable maximum overspeed (diving) rpm of 3240, given on the Power Plant Charts, and to reduce the IAS to approximately 140 mph in order to obtain the maximum horsepower available. The following procedure is recommended:

(1) Pull throttle back to obtain 3240 rpm.

(2) Raise nose of airplane to lose speed, and then return to sea level altitude. Keep IAS at approximately 140 mph.

(3) When over landing field, lower gear and come in at normal landing speed indicated in figure 28.

5. EMERGENCY EXIT DURING FLIGHT.

a. If an emergency exit must be made during flight, the following procedures are recommended:

(1) Unfasten safety belt and shoulder harness, and disconnect headphones and oxygen tube. Release sliding canopy by pulling emergency release handle on right longeron; then roll airplane over on its back and drop out.

WARNING

Before emergency release of canopy in flight, drop seat and lower head as far as possible. If excessive force was used in securing canopy prior to take-off, it may be necessary to crank the canopy back enough to relieve the pressure against the windshield before the emergency release will be effective.

(2) If possible, reduce speed and trim airplane to fly "hands off." (Trim to descend at 500 feet per minute.) Then proceed as follows:

(a) Unfasten safety belt and shoulder harness, and disconnect headphones and oxygen tube.

CAUTION

If jump is made at high altitude, remain connected to the regular airplane oxygen supply while all other preparations for leaving the airplane are made. Just before leaving the airplane, disconnect the oxygen mask from the mask-to-regulator tubing and place the type H-2 emergency bail-out oxygen cylinder in operation by pulling the rip-cord cable of the oxygen cylinder (the caution tag and pin assembly having been removed prior to take-off).

(b) Release sliding canopy.

(c) Raise seat to topmost position.

(d) Rise to a crouched position in seat, placing left foot on seat and right foot on right longeron adjacent to armor plate. Grasp armor plate with right hand and right longeron with left hand. (See figure 31.)

(e) Kick with legs and push with hands at instant of leaving cockpit, and dive for the right wing tip.

Note

The right side is recommended because the slipstream will help you clear the airplane. If this method is used, the wing will either pass your body before contact, or it will be possible to slide off the wing, and you will not strike the empennage.

6. DITCHING.

a. The airplane should be ditched *only as a last resort*. If, on an overwater flight, trouble arises and you are quite certain that you will not be able to reach land, leave the airplane while in flight. However, if it is not possible to maintain sufficient altitude for a successful parachute drop, ditching is the only remaining procedure. The instructions for ditching are as follows (figure 32.):

(1) If bombs or droppable tanks are installed, release them immediately.

(2) Release sliding canopy. (See "WARNING" note in paragraph 5. a. (1).)

(3) Be sure your shoulder harness and safety belt are fastened securely as there is a violent deceleration of the airplane upon final impact.

(4) Land into the wind with flaps half down and landing gear up. Approach with one wing low (about 20 degrees) and speed just enough above stalling to maintain lateral control. Kick hard inside rudder just as the low wing tip hits the water, so as to spin the airplane around on the surface. This is known as "landing with a swerve" and although it is a difficult maneuver, it prevents the severe diving and extremely high deceleration that always result when a straight landing is made. As soon as the airplane comes to rest, get out *immediately*.

WARNING

Get out quickly upon landing. After the final impact, the airplane will sink very rapidly, *only remaining above the surface of the water for a period of 1½ to 2 seconds*.

7. LANDING GEAR EMERGENCY LOWERING.

In the event of hydraulic system failure, the landing gear may be lowered by placing the landing gear control handle in the "DOWN" position and yawing sideways. However, if the red landing gear warning light illuminates or horn sounds when the throttle is retarded (indicating an unsafe condition), pull the fairing door emergency knob, located just forward of the control stick, and then yaw the airplane sideways to force the gear into the locked position. If the tail wheel does not lock, increase the airplane's speed to increase the air load on the partially extended wheel, or dive the airplane a short distance and pull out with enough acceleration to down the tail wheel.

8. COOLANT RADIATOR FLAP EMERGENCY CONTROL.

If, under any condition of flight, an excessive coolant temperature persists, first try the manual "OPEN" position of the

electrical control switch. If, after approximately 20 to 30 seconds, the temperature remains high and failure of the coolant flap actuator is indicated, pull the emergency release lever at the right side of the seat. One quick pull up will open the flap to a minimum of 7 inches.

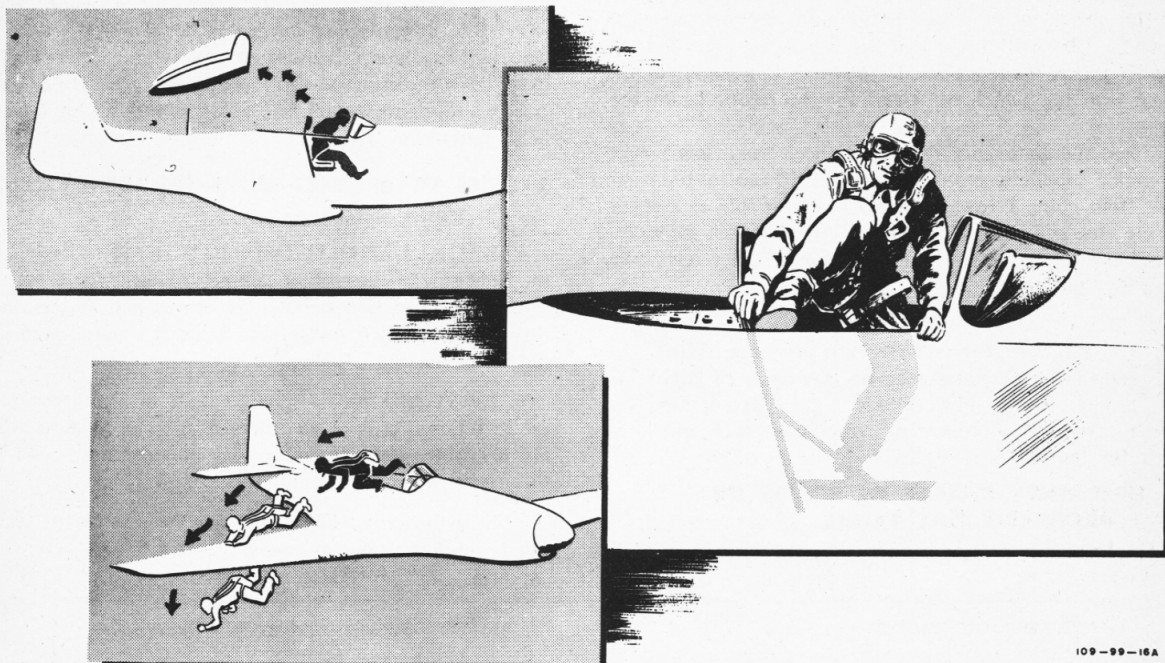


Figure 31—Emergency Exit During Flight

109-99-16A

109-00-276A

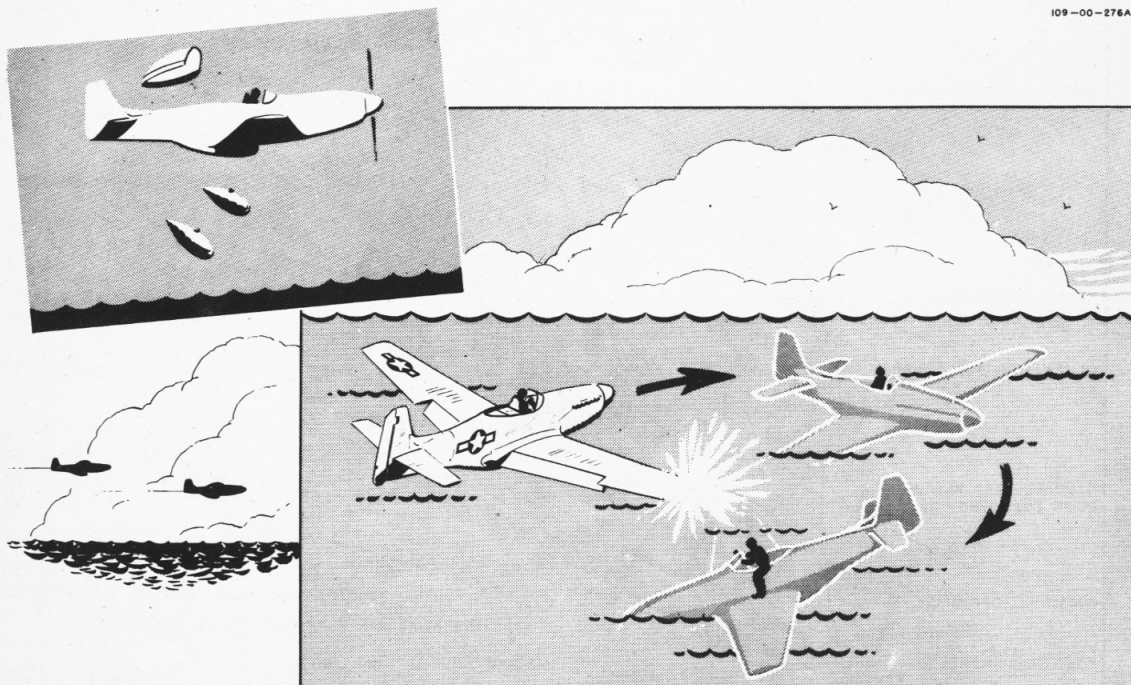


Figure 32—Ditching Airplane

The emergency control will extend the flap approximately 5½ inches beyond the flap setting at the time of release; therefore, if the high coolant temperature was not caused by actuator failure, an undesirable cooling condition may result from use of the emergency control. To check this possibility, after using the emergency release, hold the electrical control switch in the closed position for approximately 20 seconds. This will ensure that the flap is not extended beyond 7 inches if the electrical actuator is functioning at all. Then turn the switch to "OFF" for the remainder of the flight.

When the emergency release has been used, low power operation should be avoided to prevent the coolant temperature from going below the minimum allowable as a result of the greater flap opening. There is no provision for emergency closing of the flap, nor can the emergency release be reset in flight.

CAUTION

Use the emergency release with discretion. High coolant temperatures may be the result of high power settings, low altitude flight, engine malfunction, or a broken indicator rather than actuator failure.

9. EMERGENCY RELEASE OF BOMBS OR DROPPABLE FUEL TANKS.

The bombs or droppable fuel tanks are released by pull-

ing out on both emergency bomb release handles at left side of instrument panel.

10. EMERGENCY USE OF OXYGEN.

If for any reason there is a lack of oxygen, immediately turn "ON" the red emergency knob on the oxygen regulator. If a flow of pure oxygen is not received, place the type H-2 emergency bail-out oxygen cylinder in operation by pulling the rip-cord cable on the oxygen cylinder and reduce altitude to 20,000 feet or less within a time interval of 10 minutes or less.

11. USE OF MISCELLANEOUS EMERGENCY EQUIPMENT.

a. RADIO DEMOLITION SWITCH.—This switch, on the right side of the cockpit, controls a charge for demolishing the identification radio in an emergency. If identification set is installed, press both buttons simultaneously to set off the charge.

b. FIRST-AID KIT.—The contents of the first-aid kit are to be used only in an emergency, when medical aid is not available. Use contents of kit in accordance with the directions contained therein.

c. LIFE PRESERVER.—The back cushion on the seat is filled with kapok and may be used as a life preserver.

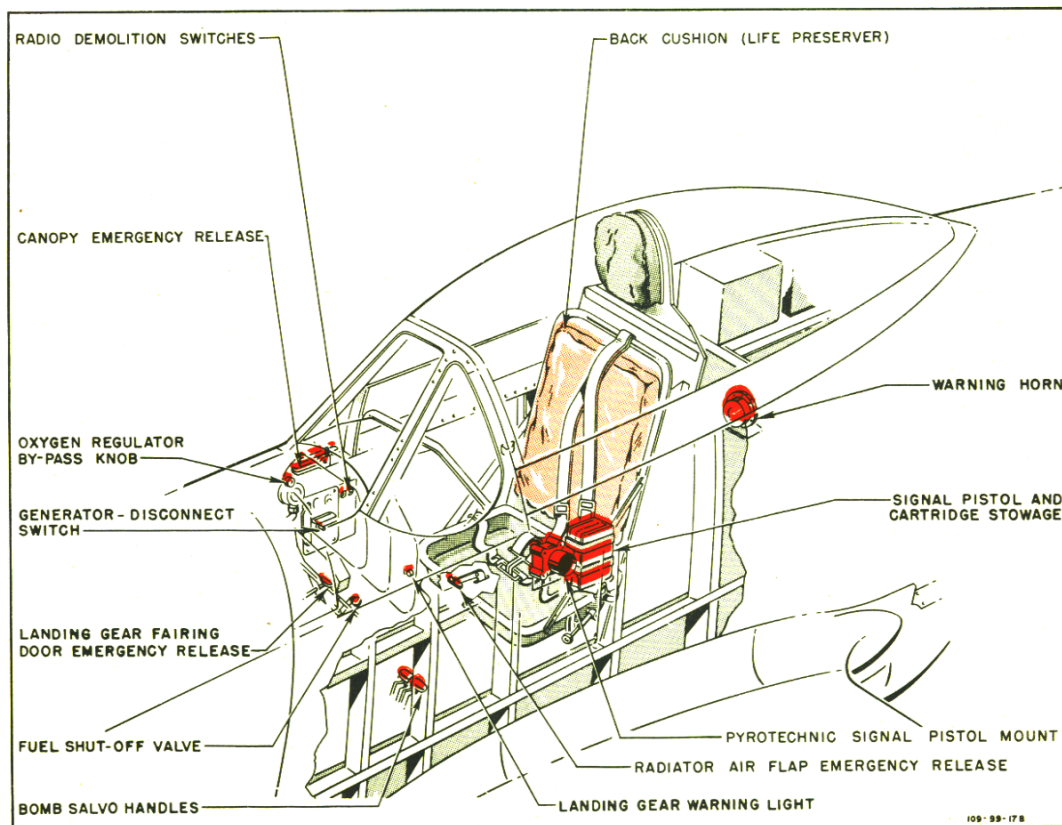


Figure 33—Emergency Equipment



1. GUNNERY EQUIPMENT.

a. GENERAL.

(1) **DESCRIPTION.**—Either of two gun installations may be used: a maximum of three fixed .50-caliber guns in each wing, or an alternate load of two guns in each wing. The maximum load includes 400 rounds of ammunition for each inboard gun and 270 rounds for each center and outboard gun. When the alternate installation is used, the center guns are removed, and 500 rounds of ammunition are provided for each outboard gun. Airplanes with the zero rail rocket installation have a K-14A or K-14B compensating gun sight. Other airplanes have a Type N-9 gun sight, the rheostat for which is on the front switch panel. Spare gun sight lamps are in clips on the underside of the instrument shroud. A gun sight aiming point camera with an overrun control is in the leading edge of the left wing. Late airplanes have a Type B-6 gun and bomb control switch assembly.

CAUTION

Keep gun sight in operation at all times when engine is running to prevent damage to gyro.

(2) OPERATION.

(a) On missions requiring gun heat, turn "ON" gun heater switch immediately after starting engine.

(b) Turn gun and camera safety switch to "CAMERA AND SIGHT." On K-14A gun sight, turn gyro motor "ON-OFF" switch on selector dimmer control to "ON." On the K-14B gun sight, the "ON-OFF" switch has been eliminated, and the gyro motor is turned on when the battery-disconnect switch is moved to "ON."

(c) Move selector switch on selector-dimmer control to "GYRO" or "FIXED AND GYRO."

(d) On combat missions, turn gun and camera safety

switch to "GUNS, SIGHT, AND CAMERA" as soon as the airplane is safely off the ground.

(e) To operate gun sight, turn on rheostat located on selector-dimmer control. (The gun sight will not operate until the gun and camera switch has been turned on.)

(f) Fire guns by squeezing trigger on control stick grip. When camera only is required, turn gun safety switch to "SIGHT AND CAMERA" and squeeze trigger.

Note

When the gun and camera safety switch is on, the heaters in the camera will function automatically at low temperature.

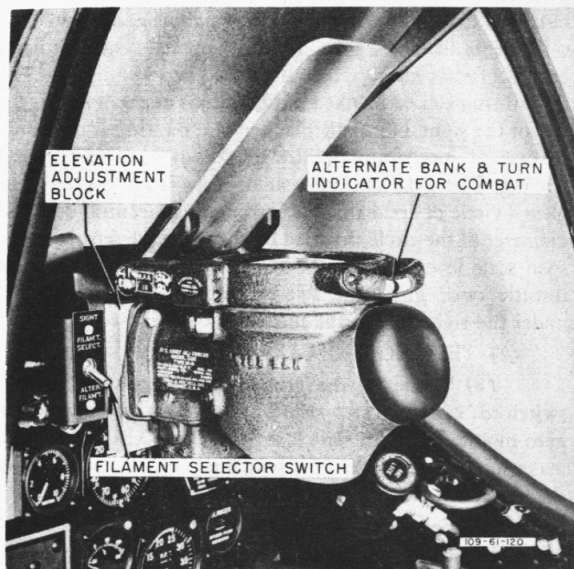


Figure 34—Type N-9 Gun Sight

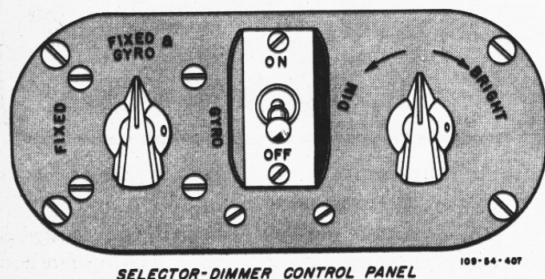
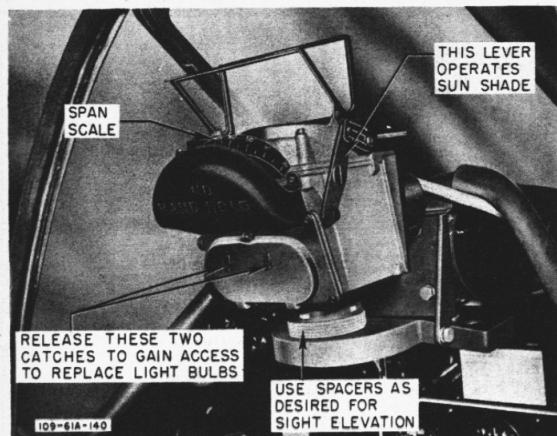


Figure 35—K-14A Gun Sight Installation

(e) Before landing, make sure that the gun and camera safety switch is at "CAMERA AND SIGHT" and gun heater switch is "OFF."

b. K-14A OR K-14B COMPENSATING GUN SIGHT.

(1) **DESCRIPTION.**—The K-14A or K-14B sight compensates the correct lead angle for target crossing speed at ranges of from 200 to 800 yards. The sight contains two optical systems, fixed and gyro. The fixed optical system projects on the reflector glass a cross surrounded by a 70-mil ring. The 70-mil ring can be blanked out by means of the lever on the left of the sight. Normally blanked out, the ring is used only in case of mechanical failure of the gyro or for ground strafing. The gyro optical system projects on the reflector glass a circle of six diamonds surrounding a central dot. The diameter of the circle is varied by changing the setting of the span scale lever on the face of the sight or by rotating the throttle twist grip. The selector-dimmer control panel is under the right side of the instrument shroud.

(2) TESTING THE GUN SIGHT.

(a) While on the ground, turn gun-camera safety switch to "CAMERA AND SIGHT." On K-14A gun sight, turn gyro motor "ON-OFF" switch to "ON"; on K-14B gun sight, make sure battery-disconnect switch is "ON." Rotate dimmer rheostat until correct reticle brilliance is obtained.

(b) Set selector to "FIXED AND GYRO." Both the fixed and gyro reticles will appear on the reflector. If the 70-mil ring appears, blank it out with lever at left of sight.

(c) Make sure dot of the gyro is superimposed on

the fixed cross. This is done by switching selector switch back and forth from "FIXED AND GYRO" to "GYRO."

(d) Take off and fly in a circle at a constant rate of turn. Rotate the twist grip on the throttle slowly and note that, with the sight set for long range (small diameter gyro reticle), the gyro reticle lags farther behind the fixed cross than when the sight is set for short range (large diameter reticle).

(3) COMBAT OPERATION OF GUN SIGHT.

(a) Identify your opponent; then set the span scale to correspond with the enemy type.

(b) Fly your airplane so that the enemy appears within the gyro reticle, and rotate the throttle twist grip until the diameter of the gyro reticle corresponds to the size of the enemy.

(c) Continue to rotate throttle twist grip, keeping the enemy within the gyro reticle—then fire!

(4) OPERATIONAL NOTES.

(a) Turn sight on before take-off, and leave on until landing, whenever the presence of the enemy is possible.

(b) When not using the sight and when maneuvering into position for attack, *keep the sight set at shortest range* (large diameter gyro reticle) and decrease the diameter to correspond to the enemy's size.

(c) *Track the target before firing.* Continually frame the target, by operating the twist grip, while tracking for a minimum period of one second; then fire. The gyro sight compensates correctly *only* after the target has been correctly framed and tracked for a minimum period of one second.

(d) Learn to use the sight in place of your flight instruments. Note that, with the selector set for normal operation (fixed and gyro), the relative positions of the fixed and gyro reticles indicate what your airplane is doing. If the cross and dot are superimposed, you are flying in a straight line.

(e) For firing at a stationary ground target, use the fixed part of the sight.

2. ZERO RAIL ROCKETS.

a. **DESCRIPTION.**—Late airplanes are equipped to carry 10 zero rail rockets, each of which is attached to two pods on the underside of the wings. If bombs or droppable fuel tanks are installed, only six rockets may be carried. The armament switches are located on the front switch panel (figure 37), and the gun sight rheostat is on a bracket, just to the right of the gun sight.

b. OPERATION.

(1) Turn "ROCKET TO BE FIRED" dial to "1". (See figure 37.)

(2) Place bomb-rocket selector switch in "ROCKETS" position.

Note

When this switch is in "ROCKETS," the bomb release circuits are inoperative.

(3) To nose arm rockets for an instant delay upon impact, turn arming switch to "DELAY."

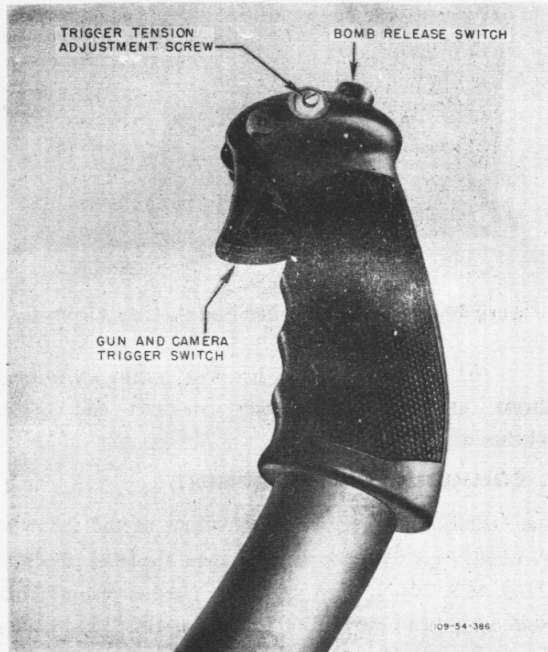


Figure 36—Gun and Bomb Control Switches—Type B-6

(4) To fire rockets one at a time, turn rocket release control switch to "SINGLE" and press bomb release button on control stick, once for each rocket.

Note

Rockets on airplanes with the MX-241-4 rocket tube modification cannot be fired simultaneously with the machine guns. An electrical interrupter has been placed in the gun firing circuit which will cut out the machine guns if the gun trigger and the rocket firing button are operated simultaneously. However, if the rocket switch on the intervalometer is "OFF," the firing circuit interrupter will not function.

(5) To fire all rockets in train, turn control switch to "AUTO" and press bomb release button for approximately one second.

Note

The firing order of the rockets singly or in train is as follows:

LEFT WING		RIGHT WING
1 3 5 7 9	INBOARD	10 8 6 4 2

(Rockets 7, 8, 9, and 10 are not installed when bombs are installed.)

3. BOMBING EQUIPMENT.

a. DESCRIPTION.—An external, removable bomb rack may be installed under each wing. Each rack will hold one 100, 250, or 500-pound bomb. Chemical tanks or combat fuel tanks may be carried on the bomb racks when bombs are not installed. The tanks are released either by normal or salvo operation of the bomb control system. Two bomb salvo handles provide a selective mechanical release of bombs or tanks. The bomb system electrical controls consist of a

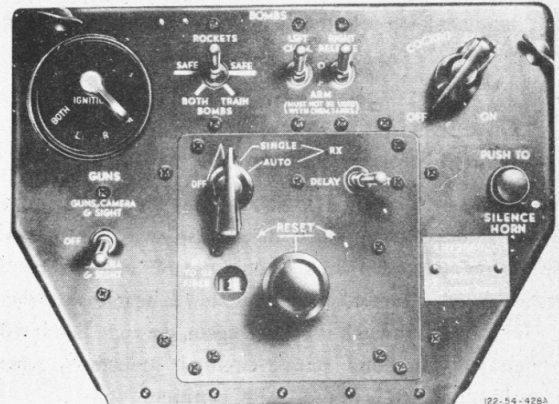


Figure 37—Front Switch Panel—Airplanes With Zero Rail Rocket Installation

bomb release switch on top of the control stick, and three bomb arming switches and a bomb release selector switch. (See figures 37 and 39.)

CAUTION

As neither the wing nor the bomb racks were designed for 1000-pound bombs, it is not recommended that they be installed. If this installation is necessary to accomplish particular missions, the airplane should be held to straight and level flight until the bombs are released.

b. OPERATION.

(1) **GENERAL.**—The electrical release of bombs is the normal release. The "SALVO" release is used only if the electrical release fails. The two "NOSE ARM" switches arm the nose fuse of the bombs on the left and right racks. The

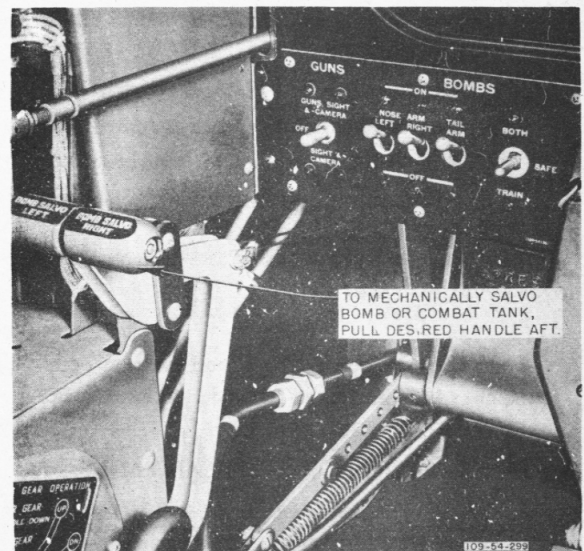


Figure 38—Bomb Controls—Early Airplanes

"TAIL ARM" switch arms the bomb tail fuse on both racks. The bomb release selector switch has the following positions: "BOTH," "SAFE," and "TRAIN."

Note

On early airplanes the selector switch "TRAIN" position is marked "SELECTIVE."

With the selector switch on "BOTH," the bombs will be released simultaneously when the release switch is pressed. When the selector switch is on "TRAIN" and the bomb release switch is pressed, the left bomb will be released; when the bomb release switch is pressed again, the right bomb will be released. The bomb release circuit is inoperative when the selector switch is in the "SAFE" position.

Note

Bombs may be released when the airplane is in any attitude of flight from a 30-degree climb to a vertical dive.

(2) INOPERATIVE POSITION OF CONTROLS.—

When the controls are not in use, position them as follows:

(a) Bomb release selector switch in "SAFE."

(b) Nose and tail arming switches "OFF."

(3) TRAIN RELEASE (Electrical).

(a) Place arming switches in desired position.

(b) Place bomb release selector switch on "TRAIN" ("SELECTIVE" on early airplanes).

(c) Press bomb release switch button momentarily to release bomb on left rack.

(d) Press bomb release button again to release bomb on right bomb rack.

(e) Bomb arming switches "OFF," bomb release selector switch to "SAFE."

(4) SIMULTANEOUS RELEASE (Electrical).

(a) Place bomb arming switches in desired position.

(b) Place bomb release selector switch on "BOTH."

(c) Press bomb release switch; both bombs will release.

(d) Bomb arming switches "OFF," bomb release selector switch to "SAFE."

Note

For emergency bomb release, pull back on both bomb salvo handles at left side of instrument panel.

(5) OPERATION OF CHEMICAL TANKS.

(a) On early airplanes, turn "ON" left and right-hand nose arming switches; then turn switches "OFF" when smoke appears.



Figure 39—Armament Switch Panel—Late Airplanes

(b) On late airplanes, lift nose arming switches to "CHEM. RELEASE" (momentary position) and release switches when smoke appears.

4. COMMUNICATION EQUIPMENT.

a. GENERAL.—Various combinations of the following seven radio sets may be installed in these airplanes: the SCR-522-A, SCR-274-N, or AN/ARC-3 (late airplanes) command equipment; the SCR-695-A or the SCR-515 identification equipment; the AN/ARA-8 homing adapter; and the AN/APS-13 tail-warning radar equipment. On early airplanes equipped with a fuselage tank the command radio equipment only may be installed; however, both command and identification equipment may be installed if the fuselage tank is removed. On late airplanes which have the battery located forward of the firewall, the IFF SCR-695-A radio may be installed in addition to the SCR-522-A (or AN/ARC-3) and AN/APS-13 equipment. (See figure 43.) A Model 438 Detrola or BC-1206-A, B, or C receiver may be installed in conjunction with the SCR-522-A. Additional communication equipment includes a signal pistol, a signal lamp, and recognition lights.

b. COMMAND SET SCR-522-A.

(1) DESCRIPTION.—This set is a push-button controlled transmitter-receiver, operating on the 100 to 156 mc band. The control box is just aft of the right-hand switch panel in the cockpit. A transmit-receive button is on the throttle lever. On some airplanes a remote contactor is installed on the left side of the instrument panel. The contactor switches the transmitter from the "A," "B," or "C" band to the "D" band for 14 seconds of every minute. The pointer on the face of the contactor indicates when the switching action will take place. Normally, the clock switch on the contactor should not be touched in flight; it is set on the ground by the service crew.

(2) OPERATION.

Note

The "A-REM" switch has been lockwired in the "REM" position.

(a) To receive or transmit on channel "A," "B," "C," or "D," press corresponding channel selector button on control box. Tubes will require approximately 30 seconds to warm. Adjust headset volume with volume control on junction box and monitor the station to be contacted. On airplanes equipped with a remote contactor, check operation with switch in "OUT" and "IN" positions. Press throttle "press-to-talk" button and speak in a normal tone. To receive, release pressure on throttle button.

Note

Indicator lamp glare is controlled by the dimmer mask lever on the control box. The lamps behind the four green jewels indicate the channel in operation. The lamp behind the white jewel opposite the "T-R-REM" switch glows when the equipment is in the receive position.

(b) To turn set off, press "OFF" button on control box.

c. RANGE RECEIVER (Detrola Model 438 or BC-1206-A, B, or C).

(1) DESCRIPTION.—This receiver covers a frequency range of 200-400 kc and is mounted on the floor at the right side of the cockpit.

(2) OPERATION.

(a) Turn hexagonal control knob clockwise to turn set on and to increase volume. Tune in desired station with "tuning knob."

(b) Turn hexagonal control knob fully counter-clockwise to turn the receiver off.

d. COMMAND SET SCR-274-N.

(1) DESCRIPTION.

(a) GENERAL.—This set consists of two transmitters and three receivers with independent controls for each group, and an antenna switching relay. The control boxes are mounted at the right side of the cockpit.

(b) TRANSMITTER.—The transmitter control box contains three switches, marked "TRANS POWER," "TRANSMITTER SELECTOR," and "TONE-CW-VOICE." The switch marked "TRANSMITTER SELECTOR" has four divisions, two of which are used. Markings on the "TONE-CW-VOICE" switch indicate the type of signal being transmitted. With the switch turned to the "TONE" position, a signal is transmitted which is practically 100 percent modulated at 1000 cycles. With the switch turned to the "CW" position, a "continuous wave" or unmodulated signal will be transmitted. With the switch turned to the "VOICE" position, the microphone will be operative and voice will be transmitted when the push-to-talk button is pressed. For long-range communication, "CW" is most effective, "TONE" next, and "VOICE" least effective. The microphone is inoperative on both the "CW" and "TONE" positions, and code signals may be transmitted by a key on top of the transmitter control box. If desired, a separate key may be plugged into the jack marked "KEY."

(c) RECEIVER.—The receiver control box is divided into three sections. A signal of specific frequency is received by using the section of the receiver control box which controls the particular receiver involved.

(2) OPERATION.

(a) TRANSMISSION.—Switch "ON" transmitter power switch, select one of the two transmitters, and turn "TONE-CW-VOICE" switch to the desired position.

(b) RECEPTION.—Turn on switch in upper right-hand corner of the control box section used. This switch, in addition to having an "OFF" position, has two selective positions marked "CW" and "MCW," each of which is an on position and indicates the type of signal to be received. To increase the volume of the signal, turn the knob on the lower left corner of the control section in a clockwise direction.

e. COMMAND SET AN/ARC-3.

(1) DESCRIPTION.—The AN/ARC-3 set consists of a transmitter and receiver, a power supply and a control box. This equipment provides remote operation on eight frequency channels for airplane-to-airplane and airplane-to-ground communication. The control box is located on the radio control panel at the right side of the cockpit with eight red channel-selector buttons on the box designated by letters "A" through "H." A volume control, also on the panel, controls the audio output of the set.

(2) OPERATION.

(a) Push any one of the eight channel selector buttons on the control box and allow approximately 30 seconds for the set to warm up.

(b) To stop the operation of the equipment, depress the "OFF" button and the small metal locking button, located forward of the channel-selector buttons, at the same time.

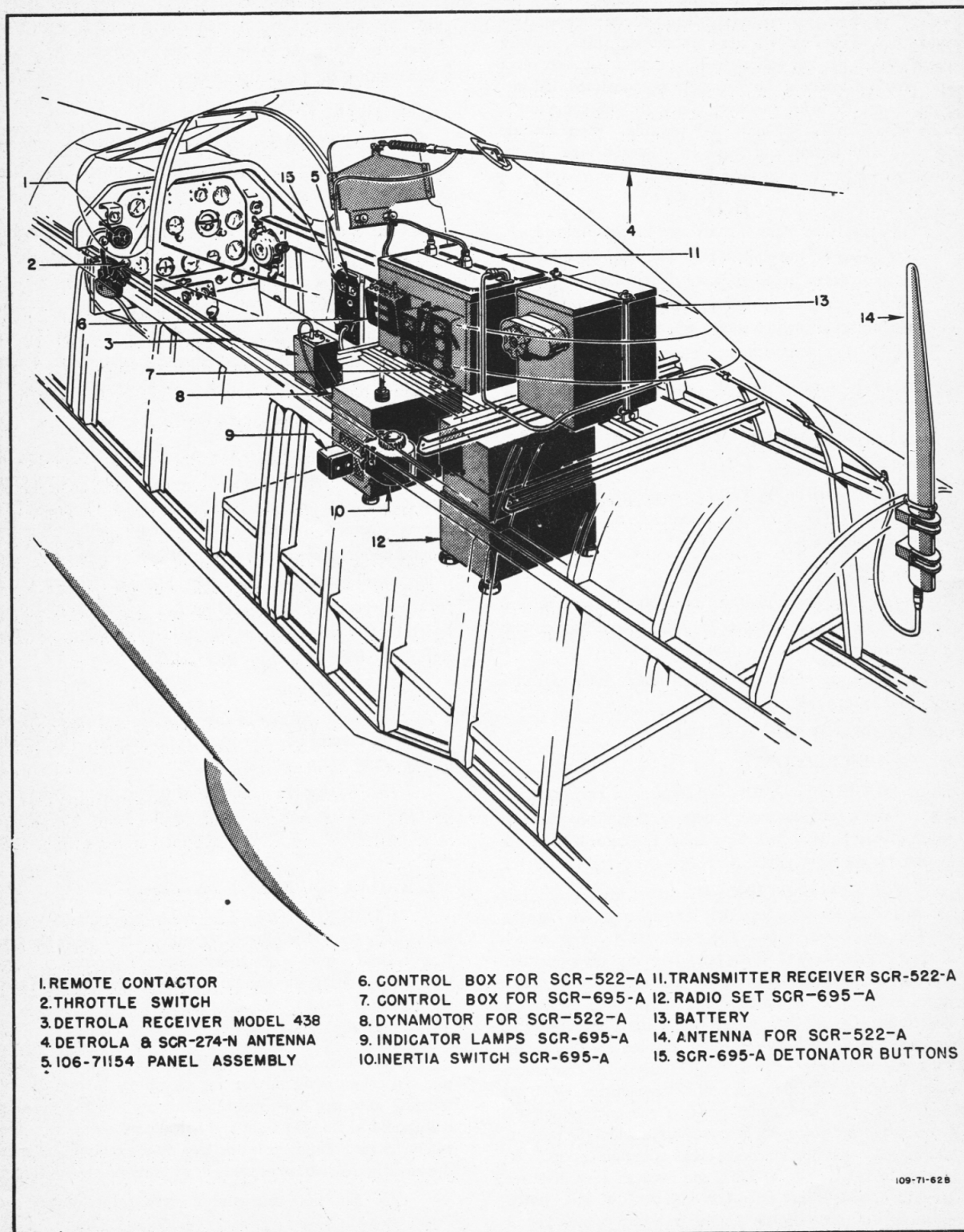
f. RADAR EQUIPMENT AN/APS-13.

(1) DESCRIPTION.—The radar equipment visibly and audibly warns the pilot of the approach of other aircraft from behind within a designated angle of protection. Controls for operating the equipment are located on the radio control panel at the right side of the cockpit.

(2) OPERATION.

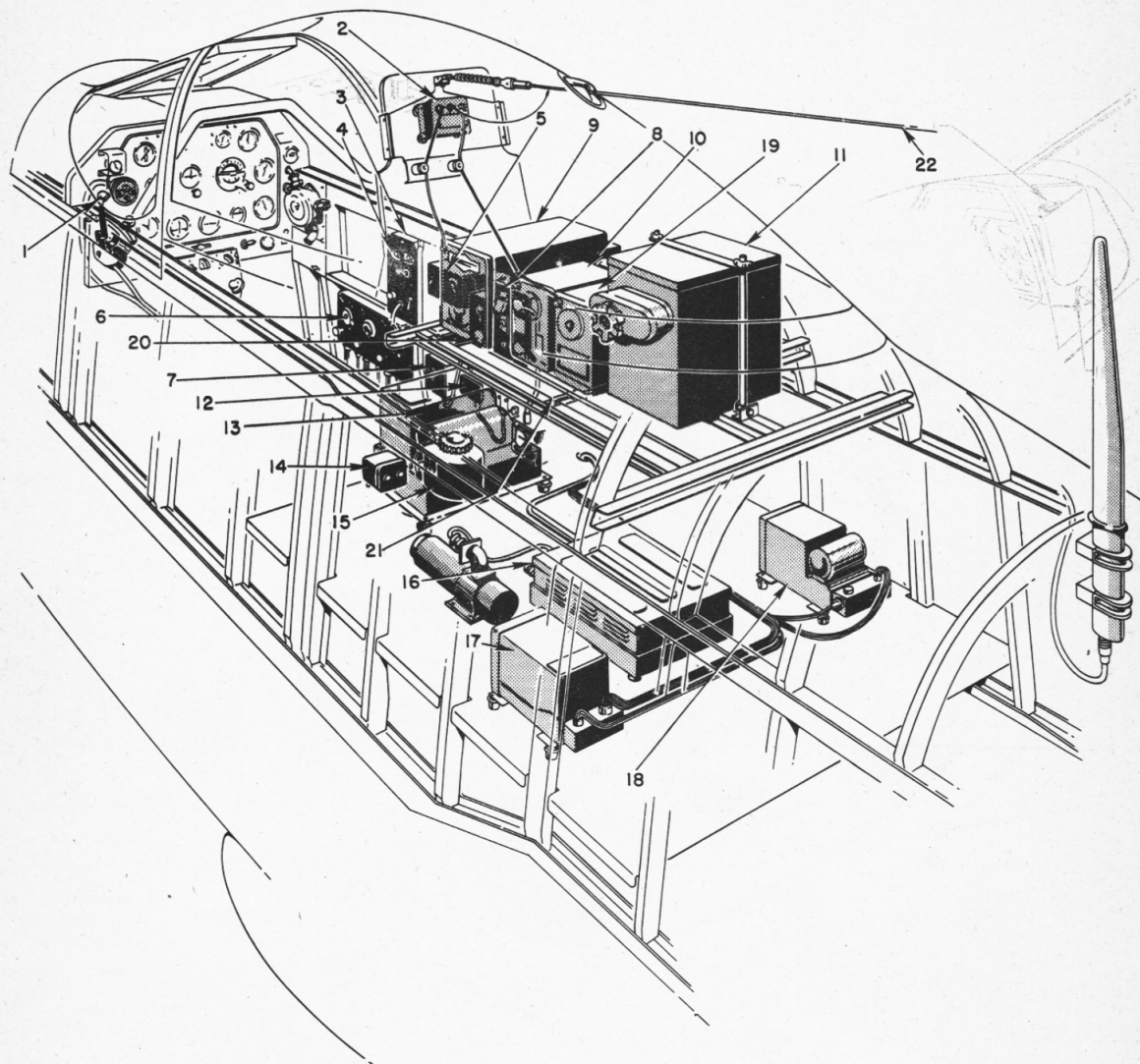
(a) Move "ON-OFF" toggle switch to the "ON" position. After warming up for approximately 3 minutes the warning indicator light should illuminate and the warning bell should sound. The light and bell should always function whenever the equipment is operated on the ground and until the airplane reaches an altitude of approximately 3000 feet.

(b) To check the equipment during flight, move "TEST" switch to "ON" position, and hold. If indicator illuminates and warning bell rings, the set is functioning properly. Let the "TEST" switch drop to its normal position.



109-71-628

Figure 40—SCR-522-A and SCR-695-A Radio Equipment—Early Airplanes



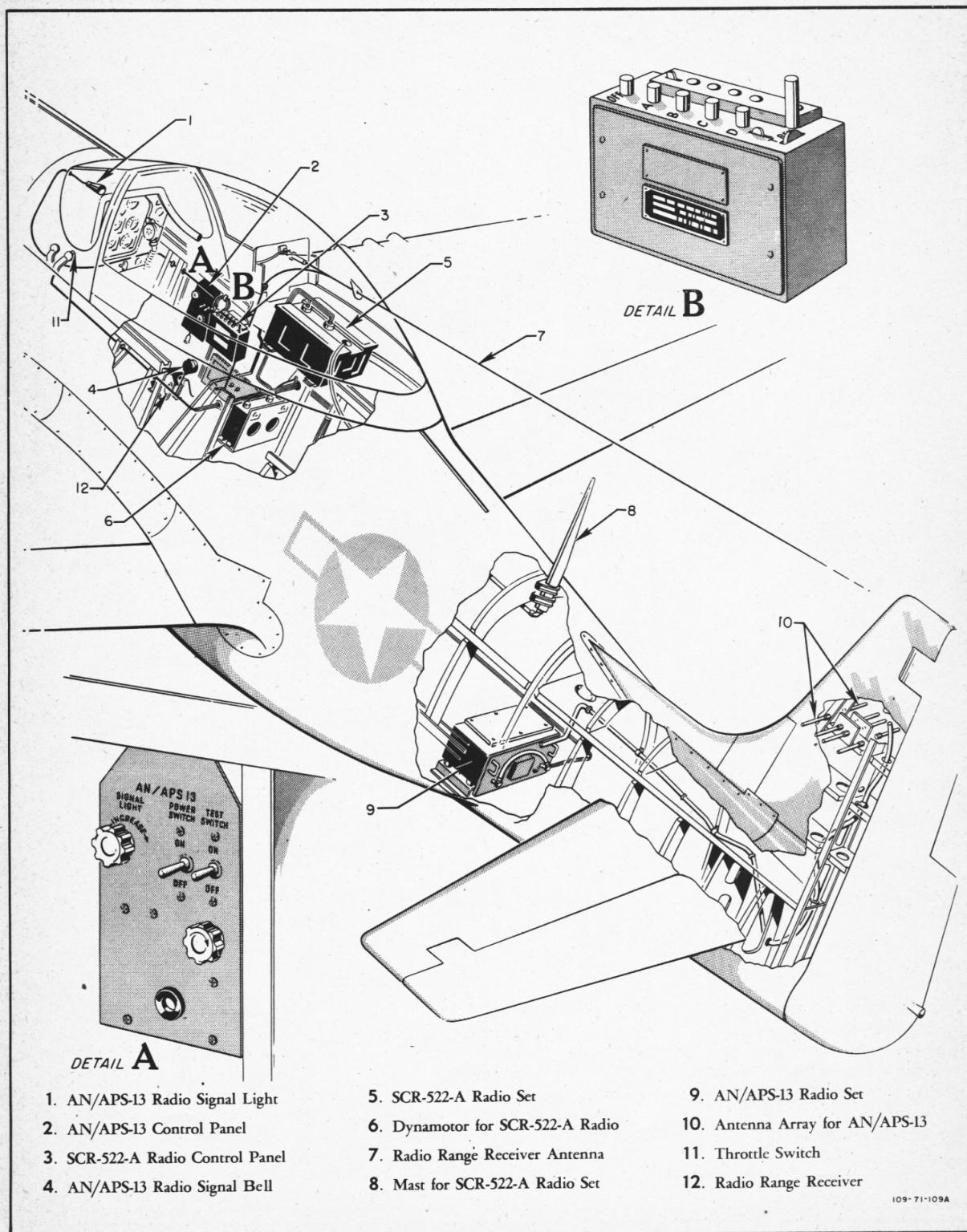
1. THROTTLE SWITCH
2. BC-442 ANTENNA RELAY
3. IO6-71154 PANEL ASSEMBLY
4. SCR-515-A DETONATOR BUTTONS
5. BC-451-A TRANSMITTER CONTROL BOX
6. BC-450-A RECEIVER CONTROL BOX

7. FL-8 FILTER BOX
8. SCR-515-A CONTROL BOX
9. BC-457 TRANSMITTER
10. BC-453 RECEIVER
11. BATTERY
12. MC-385 MICROPHONE ADAPTOR
13. BC-456 MODULATOR UNIT
14. INDICATOR LIGHTS SCR-515

15. INERTIA SWITCH SCR-515
16. SCR-515-A RADIO SET
17. BC-458 TRANSMITTER
18. BC-455 RECEIVER
19. BC-454 RECEIVER
20. IO6-71131 CHANNEL SUPPORT
21. IO9-71132 CHANNEL SUPPORT
22. SCR-274-N ANTENNA

109-71-654

Figure 41—SCR-274-N and SCR-515 Radio Equipment—Early Airplanes



109-71-109A

Figure 42—SCR-522-A and AN/APS-13 Radio Equipment—Late Airplanes

AN 01-60JE-1

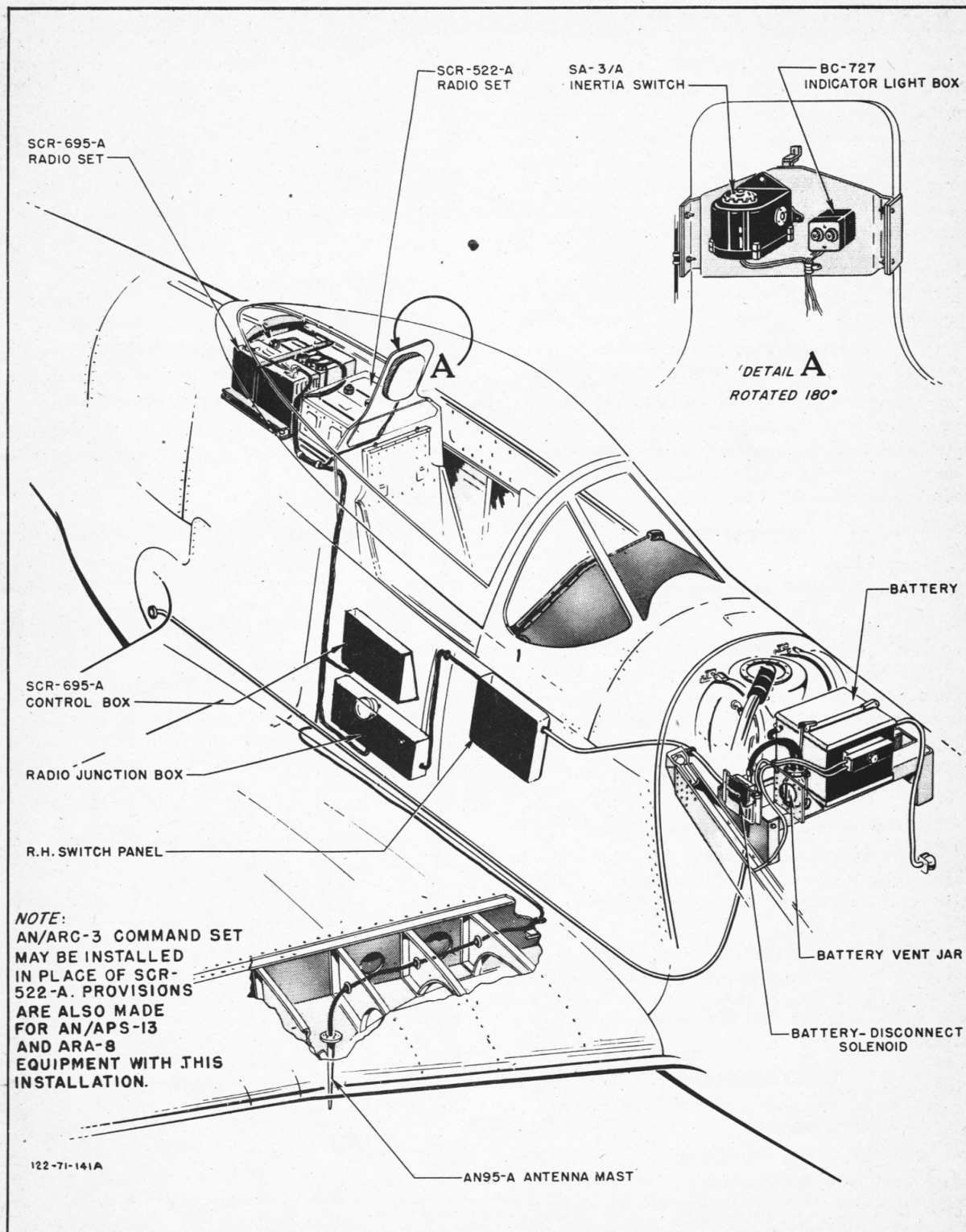


Figure 43—SCR-695-A and SCR-522-A Radio Equipment—Late Airplanes

g. HOMING ADAPTER AN/ARA-8.
(Late Airplanes).

(1) DESCRIPTION.—This adapter unit is used in conjunction with the AN/ARC-3 VHF equipment to permit homing on any transmitted carrier within the frequency range of 120 to 140 megacycles. In addition, this equipment may be used for air-to-air homing for purposes of rendezvous. Homing can be accomplished on CW, MCW, and audio pulse signals. Controls are provided above the VHF control box at the right side of the cockpit.

(2) OPERATION.

(a) To start operation of the equipment, move the "HOMING-COMM-TRANS" switch to the "HOMING" position.

(b) To stop operation of the equipment, move the "HOMING-COMM-TRANS" switch to the "COMM" position.

b. IDENTIFICATION EQUIPMENT.—The identification equipment is controlled from a box aft of the right-hand switch panel. For operating instructions, see the communications officer in charge. Detonator buttons and an inertia crash switch are provided with this equipment.

WARNING

Insert destructor plug only when the airplane is ready to take off. Remove plug immediately after landing.

i. PYROTECHNIC RECOGNITION SIGNAL PISTOL.

(1) DESCRIPTION.—An M-8 pyrotechnic pistol is stowed in a canvas holster strapped to the pistol cartridge stowage bag to the left of the seat. A pistol mount is next to the stowage bag. A cap, chained to the mount, covers the port when the pistol is not installed.

(2) OPERATION.

(a) Remove cover cap from mount.

(b) Insert muzzle of pistol in the mount so that the lugs on the pistol barrel slip into the slots; then, while depressing the mount release trigger, turn the pistol to right or left as far as it will go.

(c) To load pistol, press breech lock lever (behind the mount release trigger) and apply force on the butt until the breech opens. Then insert signal into the chamber and close breech. Pistol is cocked automatically when breech is closed.

WARNING

Do not load pistol except when it is in the mount, as no safety is provided.

j. SIGNAL LAMP.—On early airplanes, a Type AN3089 signal lamp may be stowed in a bracket on the left side of the cockpit floor. An electrical receptacle for the lamp is located behind the pilot's seat on the right side. Colored filters may be used with the lamp.

k. RECOGNITION LIGHTS.—For operation of recognition lights, see section II, paragraph 20. a. (5).

5. OXYGEN SYSTEM.

a. DESCRIPTION.—Oxygen is supplied from two Type D-2 and two Type F-2 low-pressure oxygen cylinders. See figure 45 for location of units. A Type A-14 mask is used with this equipment. The blinker flow indicator operates with the breathing of the wearer, indicating proper functioning of the system. The oxygen cylinders may be refilled without removal from the airplane by means of a filler valve located on the lower left side of the fuselage. Normal full pressure of the system is 400 pounds per square inch.

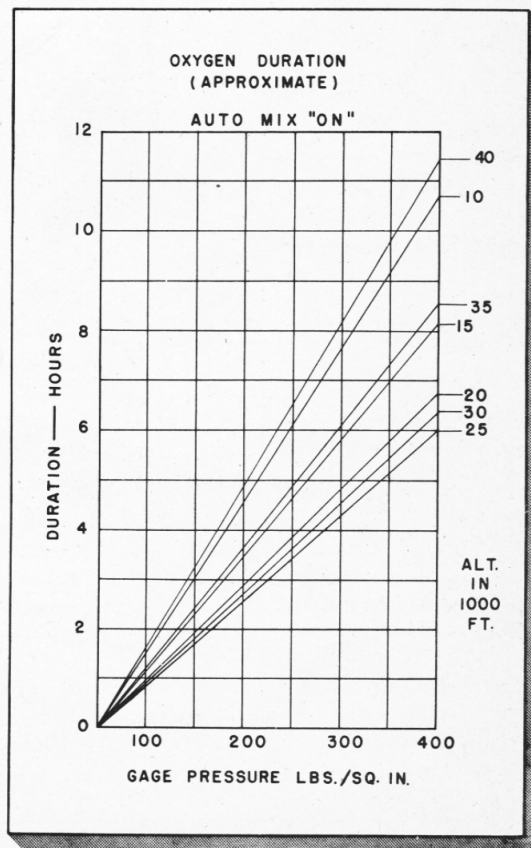
b. OPERATION.

(1) PREFLIGHT CHECK.

(a) See that mask is properly fitting and check for leakage by holding the thumb over the corrugated hose fitting and inhaling normally. See that mask is clean.

(b) Check mask fitting to see that gasket is in place; then insert fitting into end of tubing from regulator. Be sure the fit is snug and that a pull of at least 10 pounds is required to separate the two.

(c) Inspect mask regulator tubing for damage. Make sure all clamps are firmly in place.



THREE TYPE F-2 CYL'S
Figure 44—Oxygen Consumption Chart

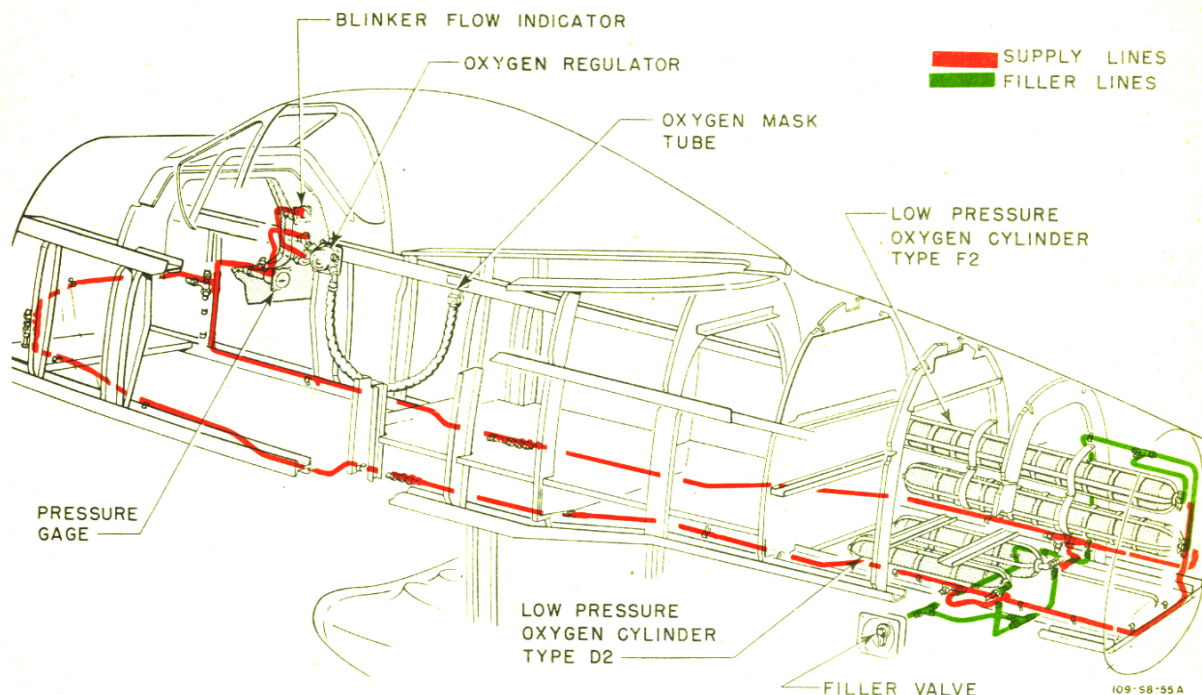


Figure 45—Oxygen System

(d) Attach the spring clip on the tubing to the clothing or parachute harness high up on the chest. It may be desirable to sew a tab of fabric or webbing to the clothing to accommodate the clip. Be sure that the attachment is high enough so that there is free movement of the head without kinking the mask hose.

(e) Make certain the knurled collar at the outlet end of the regulator is tight. Examine top diaphragm to see that it is not ruptured or distorted.

(f) Turn emergency knob "ON" to check the flow. Check the pressure gage to see that there is no perceptible pressure drop. Turn emergency knob "OFF" and ascertain that it does not leak. Leave it in this position.

(g) Turn the auto-mix to "OFF." Note on flow indicator that upon inhalation, the top diaphragm goes down and that nearly 100 percent oxygen is received. Turn the auto-mix to "ON" and note that there is little or no indication of oxygen flow on the indicator. Leave auto-mix in this position.

(h) Check pressure of the system. It must not be less than 400 pounds per square inch. Before take-off, make certain that the pressure gage shows sufficient oxygen supply for the mission.

(2) DURING FLIGHT.

(a) If necessary, manipulate the mask at regular intervals to free it from ice.

(b) Be sure hose does not become kinked or twisted.

(c) If an insufficient amount of oxygen is being supplied, turn red emergency knob on regulator to "ON."

(d) Check pressure gage and flow indicator frequently.

(e) In any flight over 30,000 feet, pay particular attention to oxygen equipment. Be sure all units and instruments are functioning perfectly before attempting flight to extremely high altitudes. Any failure of the equipment may be fatal.

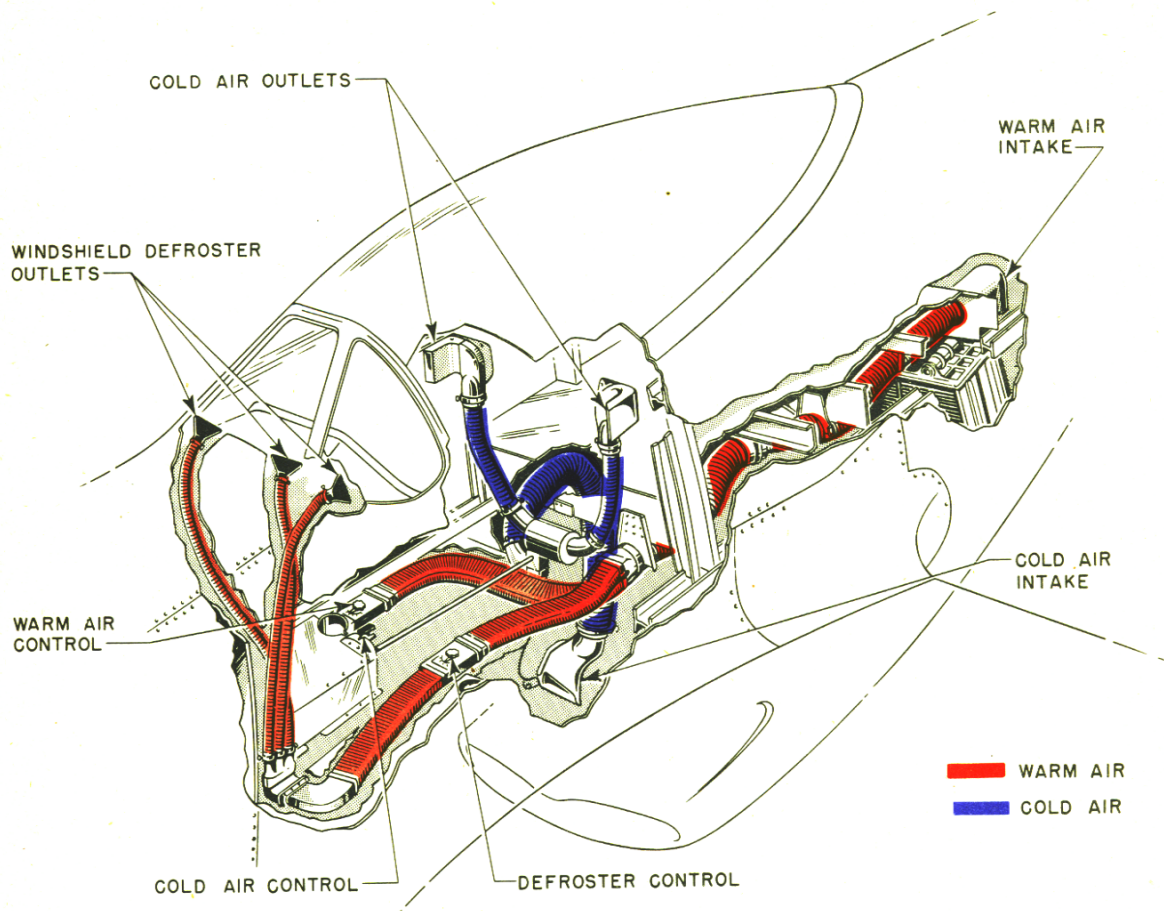
(3) AFTER FLIGHT.

(a) Be sure all oxygen equipment is in proper condition before leaving airplane. If any difficulties have developed during flight, take necessary steps to have them corrected.

(b) Wash mask with mild soap and water, dry thoroughly, and leave in a clean airy place out of the sunlight.

Note

The oxygen mask will not stand abuse. See that the mask is properly stored or hung up in the airplane when not in use. Exposure of the mask to sunlight causes rapid deterioration.



109-53-25A

Figure 46—Heating, Ventilating, and Defrosting System

6. HEATING, VENTILATING, AND DEFROSTING SYSTEM.

a. COCKPIT HEATING AND DEFROSTING.—Warm air from aft of the coolant radiator is utilized to heat the cockpit and to defrost the front and left windshield panels. (See figure 46.) The cockpit hot air control is on the floor at the right of the control column; the defroster control is on the floor at the left of the control column. To admit warm air, turn desired control to the right, toward "ON."

b. COCKPIT VENTILATION.—Air from the forward section of the radiator air scoop is used to cool the cockpit. The cold air control is on the floor at the right side of the seat. Cold air outlets are located behind the seat.

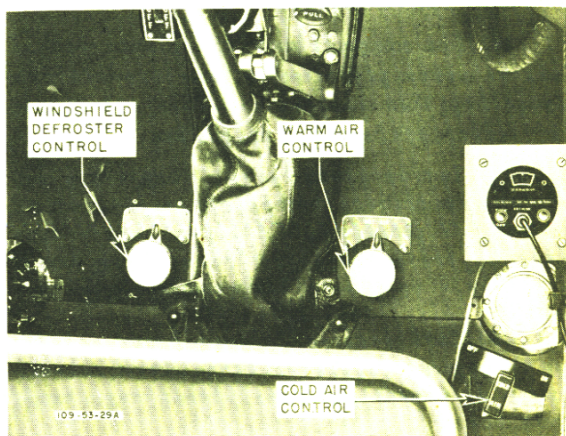


Figure 47—Heating, Ventilating, and Defrosting Controls

Section VI

EXTREME WEATHER OPERATION



1. WINTER OPERATION.

a. DESCRIPTION.

(1) GENERAL.—The primary extreme weather provisions on the airplane are for winterization. These installations are described in the following paragraphs, with instructions for their use in the sequence they will be needed.

(2) OIL DILUTION SYSTEM.

(a) Operate engines at 1000 to 1200 rpm.

(b) Maintain oil temperature below 50°C and oil pressure above 15 pounds per square inch.

(c) Dilute as follows: 4° to -12°C (40° to 10°F) 3 minutes maximum.

(d) For temperatures below -12°C (10°F) it will be necessary to drain the oil system and refill with warm oil before flight.

(3) SURGE PROTECTION.—The self-thawing oil cooler is equipped with a surge protection valve for cold weather starting. The oil cooler exit flap is fully closing.

(4) CARBURETOR ICING PROTECTION.

(a) A carburetor ice guard screen is installed in the carburetor air intake duct. Should this screen ice over, a spring-loaded door will open automatically to admit air from the engine section to the carburetor.

(b) Blank doors, supplied as loose equipment, may be installed over the filtered air intakes on each side of the engine cowling in place of the perforated doors. When these doors are installed, engine compartment air will enter the induction system whenever the carburetor cold air control is placed in the "UNRAMMED FILTERED AIR" position. On late airplanes, movement of the hot air control to "HOT" will ensure that a maximum amount of heated air is entering the carburetor.

(5) CARBURETOR AIR TEMPERATURE GAGE.—

The carburetor air temperature gage is mounted on the lower left corner of the instrument panel.

(6) WING, ENGINE, AND PROPELLER COVERS.

—The airplane is provided with an engine and a cockpit cover. Wing and propeller covers will be furnished by the AAF.

(7) GUN HEATERS.—The electrical gun heaters are controlled by a switch on the right switch panel.

(8) COOLANT RADIATOR EXIT FLAP.—A spring-loaded baffle in the exit flap makes the flap fully closing. (See figure 48.) When not installed, the baffle is stowed in the airplane as loose equipment.

b. OPERATION.

(1) STARTING ENGINE.—A normal start should be made by following the procedure outlined in section II. The following supplementary instructions are to be followed if any difficulty is encountered when starting the engine.

(a) Preheat the engine and the instrument panel before attempting to start the engine. In extremely cold weather, it may be necessary to preheat the oil and coolant before starting.

Note

If the outside air temperature is -23°C (-10°F) or colder, an engine start without the use of ground heating facilities should not be attempted. Excessive priming and numerous unsuccessful attempts to start without the use of ground heat are detrimental to the engine and accessories.

(b) Use a portable generator instead of the conventional battery cart for starting the engine, as batteries quickly lose their charge at below freezing temperatures.

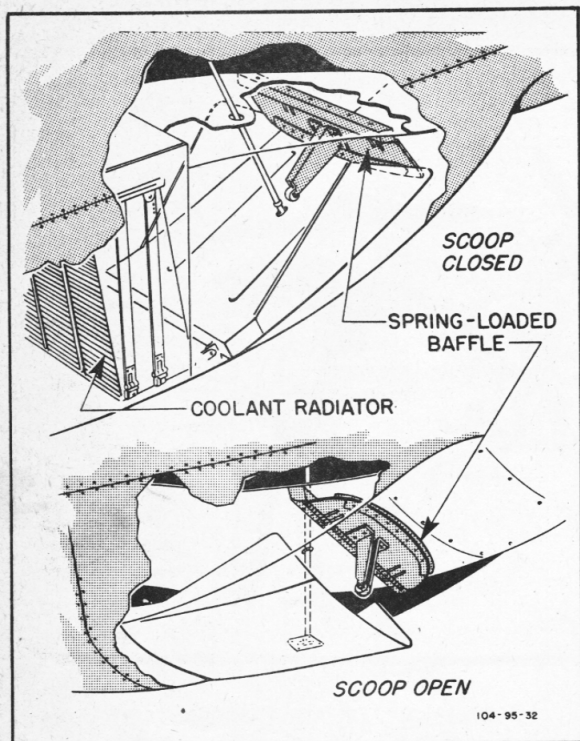


Figure 48—Coolant Radiator Outlet Duct Baffle

(c) Pull propeller through 5 or 6 revolutions by hand before engaging starter.

(d) When sub-zero weather makes starting difficult, move the mixture control from "IDLE CUT OFF" to "AUTO RICH" or "RUN" at the same time the starter is engaged with the engine. However, it is essential that the mixture control be moved back to the "IDLE CUT OFF" position if the engine does not start before the fourth revolution. Normally, the engine will start on the second or third revolution. However, if the engine does not start, turn "OFF" the ignition switch and pull the engine through by hand with the throttle fully opened to clear the engine of excess fuel.

(e) If the engine fails to start, moisture on the spark plugs may be the cause. Remove at least one plug from each cylinder and dry the points. Make another attempt to start the engine after replacing the plugs.

(f) Start the engine normally, without regard to the oil dilution system. After starting engine, if a heavy viscous oil is indicated by oil pressure that is too high, or by oil pressure that fluctuates or falls back when the engine rpm is increased, the dilution switch may be pushed "ON" (3 minutes maximum) to dilute the oil and correct this condition. This method should be used only if time and extreme temperature conditions do not permit normal engine warm-up.

CAUTION

When it is not known to what percentage the oil has been diluted, it is necessary to drain and refill the oil system before flight.

(g) Do not run the engine at more than 1300 rpm until the oil has reached a temperature of 15°C.

Note

If blank doors are installed on the filtered air intakes, engine warm-up may be facilitated by moving carburetor air control to "UNRAMMED FILTERED AIR." On late airplanes, move hot air control to "HOT."

(2) TAKE-OFF.

(a) Do not take off with snow, ice or frost on the wings. Even loose snow cannot be depended upon to blow off, and even a thin frost layer can cause loss of lift and very treacherous stalling characteristics. Since frost formation can be very rapid, it may be necessary to taxi out to the take-off position before removing the protective covers from the flight surfaces.



Note

When the outside air temperature is 0°C (32°F) or lower, it is advisable to use carburetor heat during take-off to improve vaporization of fuel.

(b) When taking off or landing on a narrow strip of clear ice, cross winds are particularly dangerous because of poor maneuverability caused by lack of traction. If the wind is gusty, the airplane may be blown completely off the ice before control can be regained.

(3) FLIGHT.

(a) After taking off from snow or slush-covered fields, operate the landing gear and flaps through several cycles to prevent them from freezing in the up position.

(b) Turn "ON" the pitot tube heater switch. This switch should not be "ON" with the airplane on the ground, as there is insufficient cooling in the pitot head to prevent overheating.

(c) When icing of the carburetor is indicated by irregular engine operation, and the airplane has blank doors over the filtered air intakes, move carburetor cold air control

AN 01-60JE-1

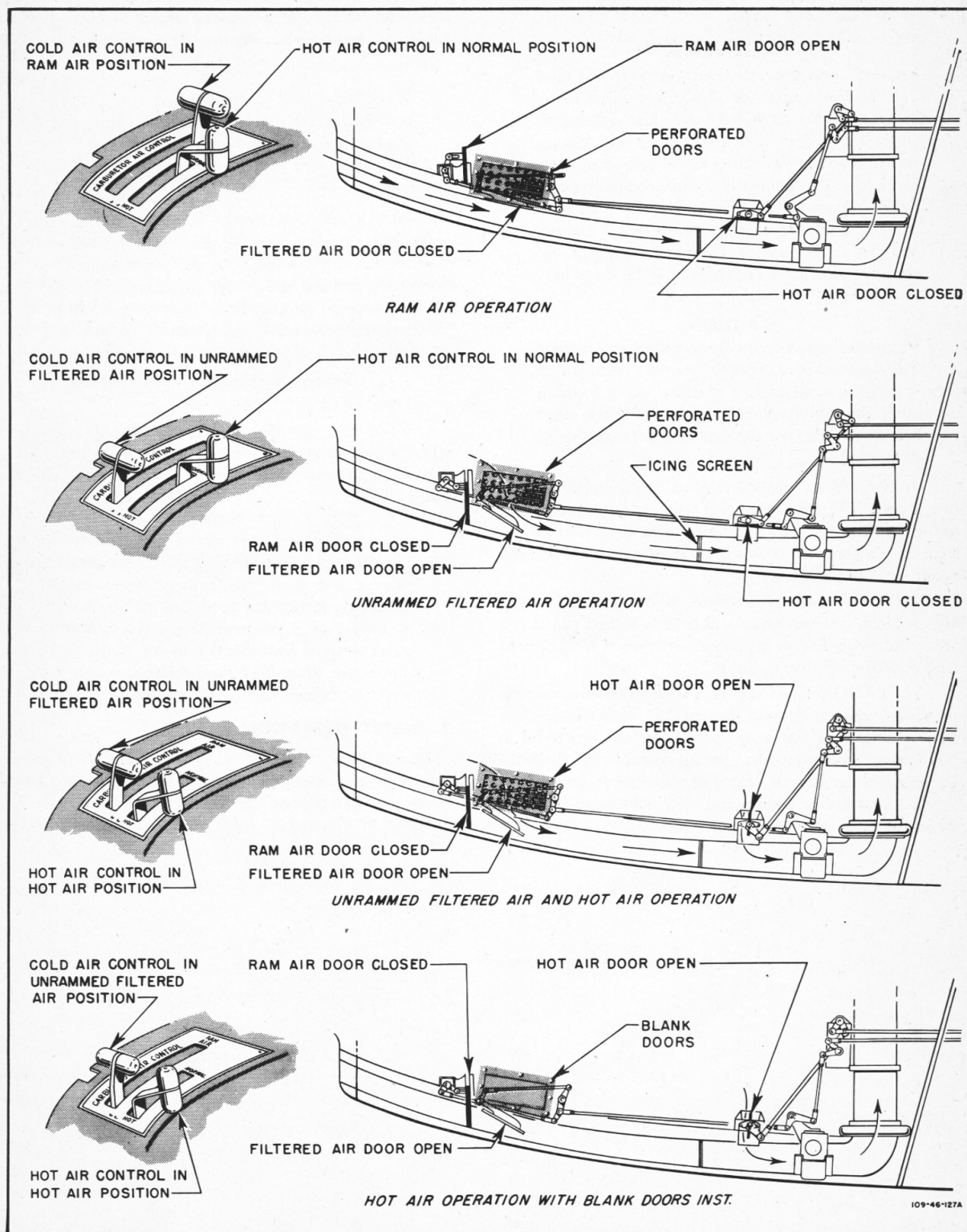


Figure 49—Operation of Carburetor Air Induction System

to "UNRAMMED FILTERED AIR." On late airplanes, move carburetor heat control to "HOT."

WARNING

Do not use carburetor heat on V-1650-3 and V-1650-7 engines above 12,000 feet unless flying in icing conditions. If carburetor heat is required above 12,000 feet, it should be used with discretion since excessive leaning of the fuel-air mixture may occur. The automatic altitude compensator in the carburetor is adversely affected by high temperature and low density conditions. If leaning becomes severe, as indicated by rough engine operation, power should be reduced or the use of heat discontinued.

CAUTION

Because of the constant-speed propeller governor and the automatic manifold pressure regulator, it is difficult to determine whether ice is forming other than by irregular engine operation, since neither the rpm nor the manifold pressure should change.

(d) Increase propeller speed momentarily by approximately 200 rpm every half-hour to assure continued governing at extremely low temperatures. Return to the desired cruising rpm as soon as the tachometer shows that the governor is functioning.

(e) Stay on a prearranged flight course as closely as possible, so that searchers will be able to find you if you are forced down. Except in extreme emergency, it is better to land or crash-land than to bail out.

(4) LANDING.—Temperature inversions are common in winter, and the ground may be 15° to 30°C (27° to 54°F) colder than that at altitude. Therefore, be careful to avoid excessive cooling when letting down. Lower the landing gear and use flaps to reduce air speed while descending. Retain considerable power, and if possible, maintain the oil temperature above 20°C and the coolant temperature

above 60°C during all letdowns. Lower readings than these may result in the engine cutting out or the failure of the engine to respond when the throttle is advanced.

Note

When the outside air temperature is 0°C (32°F) or lower, it is advisable to use carburetor heat during landing to obtain better vaporization of fuel. This also helps prevent the engine from cutting out.

(5) AFTER LANDING.—To obtain sufficient dilution of the oil to facilitate starting, idle or stop the engine to cool it before starting dilution. This will prevent rapid evaporation of the gasoline and ensure that the viscosity of the oil has been reduced sufficiently. In most cases it will be found that the engine has cooled sufficiently for dilution by the time the airplane reaches the flight line. Dilute oil as follows:

(a) Operate the engine at 1000 rpm and maintain an oil temperature of 50°C or less.

(b) For ground temperatures of 5°C (40°F) or less, hold oil dilution switch in the "ON" position for 3 minutes (maximum); then stop engine and release oil dilution switch.

Note

It has been determined through tests conducted on V-1650 engines that diluting the oil more than 10 percent will cause the scavenge system to fail. Therefore, restrict the period of oil dilution to a *maximum* of 3 minutes. When the outside air temperature is such that 3 minutes oil dilution is insufficient, drain the oil and refill the system with warm oil before starting the engine.

2. DESERT OPERATION.

Dust filters are installed in the air intake ducts, at each side of the engine compartment. When conditions warrant, or at the direction of the Operations Officer, use "UNRAMMED FILTERED AIR" for starting, take-off, and landing.

Appendix I

OPERATING CHARTS, TABLES, CURVES AND DIAGRAMMS



A-1. ARMOR PROTECTION.

Armor protection is illustrated in figure 50.

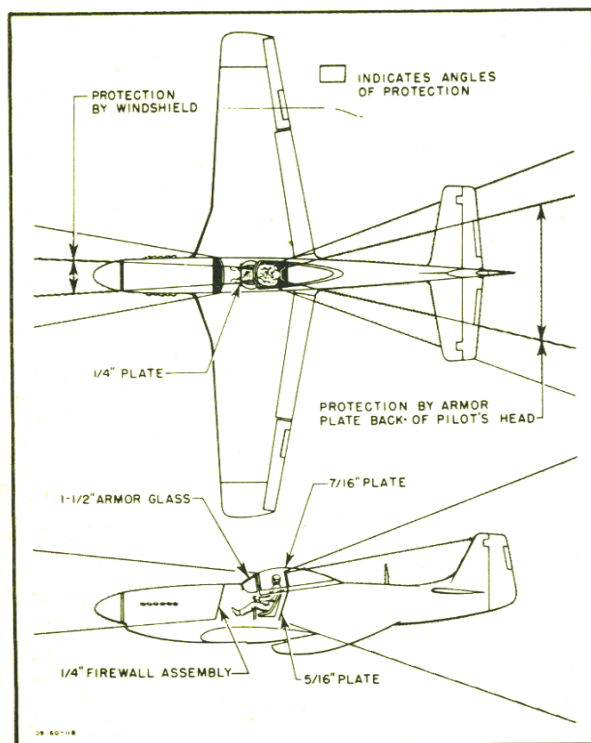


Figure 50—Armor Protection

Revised 7 May 1947

A-2. FLIGHT PLANNING.

A-3. GENERAL.

A-4. A series of charts are provided on the following pages to aid in selecting the speeds and powers required to obtain various ranges. These charts are divided into two sets: (1) Take-off, Climb and Landing Chart, (2) Flight Operation Instruction Charts.

A-5. These charts are provided to give the pilot sufficient data to determine a safe and efficient flight plan. Inasmuch as the number of variables involved makes very accurate range predictions impossible the ranges and fuel flows quoted are conservative. For example, data based on flight test data (shown in black) are 5% conservative. The speeds quoted on any one chart are those obtained with gross weight equal to the high limit of the weight band shown on the chart. This policy along with the previously mentioned 5% conservatism makes allowances for differences in airplanes such as speeds, fuel flows, engine power output, pilot technique, etc. *No allowances* have been made for wind, navigational error, combat, formation flights, or endurance reserve. Appropriate allowances should be dictated by local policy.

A-6. The charts are arranged to give maximum facility for pre-flight and in-flight range planning. The following will be noted on inspection.

a. The climb chart gives fuel requirements for warm-up, take-off, and climb to any altitude for three typical weights. The fuel tabulated in the column labeled "at sea level" shows the allowance for warm-up, taxi, and take-off. Fuel requirements listed at other altitudes include this allowance plus the fuel required to climb from sea level. If it is desired to determine the fuel required to make an in-flight

climb from one altitude to another, i.e., 15,000 feet to 30,000 feet, the difference of the tabulated fuel required to climb to these two altitudes will be the climb fuel necessary.

b. Take-off and landing distances are shown for various combinations of gross weight, field altitude, winds, and type runways.

c. Seven Flight Operation Instruction Charts covering the various loading combinations for this airplane are presented.

d. Maximum to minimum practical fuel loadings are entered on each chart under the fuel column.

e. Data listed under Column I is for high speed cruising at max continuous (normal rated power). Columns II, III, IV, and V give progressive increases in range with a sacrifice in speed. Ranges shown in any column for a given fuel quantity can be obtained at various altitudes by using the power settings listed in the lower half of the chart in the same column.

f. Ranges shown on a given chart are based on fuel flows obtained by resetting power as gross weight changes to lower weight bracket on succeeding charts.

A-7. USE OF CHARTS.

A-8. The following sample problem based on a typical P-51D mission and employing actual chart values demonstrates how the charts should be used.

A-9. It is required that a P-51D be ferried to a base located 1750 miles from the factory. The first section (1000 miles) consists of climb to and cruise at 10,000 feet and the second section (750 miles) consists of climb from 10,000 feet to 15,000 feet and cruise at 15,000 feet to avoid mountainous terrain, and descent. Drop tanks will be carried all the way.

A-10. Write down the conditions of the problem and the questions to be answered.

Required range	1,750 miles
Weather	CAVU
Winds (at factory)	15 mph headwind at 10,000 ft.
Winds (1,000 miles out) ..	10 mph tailwind at 15,000 ft.
Aircraft basic weight	7,653 lb
(includes trapped fuel, oil, misc equipment)	
Crew weight (1)	200 lb
Oil (12.5 gal)	94 lb
Drop tanks (2—110 gal)	180 lb

Total weight (less fuel)	8,127 lb
Max fuel capacity (489 gal)	2,934 lb

Total gross weight	11,061 lb.
--------------------------	------------

A-11. Determination of the actual flight plan. Now that the conditions of the flight have been determined, it becomes necessary to establish a flight plan as follows:

a. The cruise will be started at 10,000 feet.

b. Determine the fuel available for flight planning by deducting the necessary fuel allowances and reserves from the actual fuel available.

General reserve for unexpected difficulties—53 gallons.

It will be noted that 53 gallons of fuel represent one

hour's flying time in Column V at a gross weight of 10,300 pounds to 8100 pounds (figure 55) at 15,000 feet. One hour's fuel reserve is considered sufficient for this type mission. The endurance is figured at the lightest weight because reserve fuel, obviously, will not be used until this light weight is reached. Fifteen thousands feet is the altitude at the end of the cruise due to terrain.

Wind reserve (1st section)—13 gallons.

This figure is arrived at as follows: the 1st section of the trip is 1,000 miles in length and, assuming it will be flown in Column IV, the airspeed will be 272 mph (find airspeed opposite the 10,000 foot entry in Column IV of the 12,200 pound to 10,300 pound chart). Therefore, the no-wind time of the 1st section will be $1,000/272=3.68$ hours. The actual time allowing for a 15 mph headwind is $1,000/(272-15)=3.89$ hours. The fuel required for the headwind at 62 gph is $(3.89-3.68) \times 62=13$ gallons.

Wind reserve (2d section)—0 gallons.

Normally, tailwinds are treated as a no-wind condition.

Warm-up, take-off, and climb to 10,000 feet—26 gallons.

Reference to Climb Data Chart shows 26 gallons are required for warm-up, take-off, and climb to 10,000 feet when the airplane weighs 11,000 pounds.

Climb from 10,000 feet to 15,000 feet—5 gallons.

After completing the 1st section, the airplane will be climbed to 15,000 feet to avoid terrain. The climb will not be made until the 1st section or 1,000 miles have been flown. Reference to the Climb Data Chart using an estimated gross weight of 10,000 pounds shows that 29 gallons are required to climb to 15,000 feet and that 24 gallons are required to climb to 10,000 feet. The difference between the quantities is 5 gallons or the amount of fuel necessary to climb from 10,000 feet to 15,000 feet.

Collecting all the required fuel allowances:

General reserve for unexpected difficulties	53 gal
Wind reserve (1st section)	13 gal
Wind reserve (2d section)	0 gal
Warm-up, take-off, and climb to 10,000 ft at	
11,000 lb	26 gal
Climb from 10,000 ft to 15,000 ft	5 gal

Total Allowances	97 gal
------------------------	--------

Therefore, the actual fuel for level flight cruising at zero wind is: $489-97=392$ gallons. Reference to the 12,200 pound to 10,300 pound chart (figure 55) shows that 1,770 miles can be flown with 400 gallons in Column IV. 1,750 miles will require approximately 396 gallons. This unconservative difference of 4 (396—392) gallons is negligible and this answer gives you a quick solution of the problem.

c. However, to ascertain that the mission is actually being flown in the most efficient manner, a more thorough analysis of the problem will have to be accomplished. It has been noted that the charts are divided into approximate 2,000 pound increments; and since the airplane weight will vary by more than 2,000 pounds, it will be necessary to divide the flight into several legs. (Note: the use of 333 gallons of fuel will reduce the airplane weight by 2,000 pounds.)

Leg	Fig.	Initial Wt.	Fuel Aboard	Condition	Altitude	Power Settings	Fuel Used	Distance
1	51	11,061	489	Warm-up, Take-off, and Climb	S.L. to 10,000 ft	2700 rpm 46 MP RUN	26	0

Entries whose derivation may not be clear are explained as follows:

INITIAL WEIGHT:

This was computed in paragraph A-10.

RPM, MP, MIXTURE, AND FUEL USED:

These items are read directly from the charts.

Note

Time consumed and distance covered in climbing

is considered negligible in this instance; however, these items should be considered in extremely long climbs.

The second leg of the flight will be accomplished at 10,000 feet in accordance with the information as contained in the 12,200-pound to 10,300-pound chart with Column IV conditions:

Leg	Fig.	Gross Wt.	Fuel Remaining	Power Settings	GPH	TAS	Ground Speed	Hours	Dist. Ground Miles	Fuel Used
2	55 Sheet 1	10,905	463	1950 RPM 37.5 MP RUN	62	272	257	1.63	418	101

Note: Length of leg 2 is determined by the time required for the gross weight to decrease to 10,300 pounds.

GROSS WEIGHT:

In using 156 pounds of fuel in warm-up, take-off, and climb, weight becomes $11,061 - 156 = 10,905$ pounds. (Use fuel weight as 6 pounds per gallon.)

FUEL REMAINING:

Fuel was reduced 26 gallons in leg 1.

RPM, MP, MIXTURE, GPH, AND TAS:

These items are read directly as entries opposite 10,000 feet in Column IV.

FUEL USED:

Calculated by subtracting upper weight limit of the following chart from the gross weight. ($10,905 - 10,300 = 605$ pounds or 101 gallons.)

HOURS:

The time was arrived at by dividing the fuel used by the fuel flow, i.e., $101/62 = 1.63$ hours.

GROUND SPEED:

This was determined by subtracting the headwind from the TAS, i.e., $272 - 15 = 257$ mph.

DISTANCE:

The mileage was calculated by multiplying the ground speed by the hours, i.e., $257 \times 1.63 = 418$ miles.

Now that the gross weight has been reduced to 10,300 pounds, the remainder of the flight will be flown on the basis of the information listed on the 10,300 pound to 8,100 pound chart.

Leg	Fig.	Gross Weight	Fuel Remaining	Power Settings	GPH	TAS	G.S.	Hours	Dist.	Fuel Used
3	55 Sheet 2	10,300	362	1750 RPM 35.5 MP RUN	54	259	244	2.38	582	129

Note: Length of leg 3 is determined by the distance remaining to the point at which the climb to 15,000 feet is started. $1,000 - 418 = 582$ miles (remaining distance).

GROSS WEIGHT:

In using 101 gallons or 605 pounds of fuel to fly leg 2, the weight becomes $10,905$ pounds — $605 = 10,300$ pounds.

FUEL REMAINING:

Fuel was reduced 101 gallons in leg 2.

RPM, MP, MIXTURE, GPH, TAS:

These items are read directly as entries opposite 10,000 feet in Column IV.

GROUND SPEED:

The speed was determined by subtracting the headwind from the true airspeed, i.e., $259 - 15 = 244$ mph.

HOURS:

The time was arrived at by dividing the remaining distance by the ground speed, i.e., $582/244 = 2.38$ hours.

FUEL USED

Multiply gph by hours $= 54 \times 2.38 = 129$ gallons. Upon reaching the point 1,000 miles from the factory it is planned to climb to 15,000 feet:

<i>Leg</i>	<i>Fig.</i>	<i>Gross Weight</i>	<i>Fuel Remaining</i>	<i>Condition</i>	<i>Altitude</i>	<i>Power Settings</i>	<i>Fuel Used</i>
4	51	9,526	233	Climb	10,000 ft. to 15,000 ft.	2700 RPM 46 MP RUN	5

GROSS WEIGHT:

In using 774 pounds (129 gallons) of fuel to fly leg 3, the gross weight becomes $10,300 - 744 = 9,526$ pounds.

FUEL REMAINING:

Fuel was reduced 129 gallons in leg 3.

RPM, MP MIXTURE:

These items are read directly from the Climb Data Chart.

FUEL USED:

This quantity is determined from the Climb Data chart opposite 10,000 pounds gross weight. Subtract the amount of fuel used for climb to 15,000 feet from the amount of fuel used for climb to 10,000 feet ($29 - 24 = 5$ gallons). The time and distance are neglected in this case.

<i>Leg</i>	<i>Fig.</i>	<i>Gross Weight</i>	<i>Fuel Remaining</i>	<i>Altitude</i>	<i>Power Settings</i>	<i>GPH</i>	<i>TAS</i>	<i>G.S.</i>	<i>Hr.</i>	<i>Dist.</i>	<i>Fuel Used</i>
5	55 Sheet 2	9,496	228	15,000 ft.	2000 RPM FT RUN	59	279	279	2.69	750	159

Note: Leg 5 is the distance from the predetermined climb point to the destination.

GROSS WEIGHT:

In using 30 pounds (5 gallons) of fuel to fly leg 4, gross weight becomes $9,526 - 30 = 9,496$ pounds.

FUEL REMAINING:

Fuel was reduced 5 gallons in leg 4.

RPM, MP, MIXTURE, GPH, TAS:

These items are read directly as entries opposite 15,000 feet in Column IV.

GROUND SPEED:

This speed equals TAS for the last 750 miles as the tailwind is considered as no wind in this instance.

HOURS:

The time was computed by dividing the distance by the ground speed, i.e., $750/279 = 2.69$ hours.

FUEL USED:

Multiply gph by hours, i.e., $59 \times 2.69 = 159$ gallons.

Calculated fuel remaining at end of flight is $228 - 159 = 69$ gallons. The original allowance for contingencies was 53 gallons, so that an excess (due to more accurate step by step analysis) of 16 gallons above requirements is available.

A-12. Suppose that upon arrival at the destination, the field is closed in due to bad weather and an alternate field 250 miles farther on is selected. Reference to figure 55, sheet 2, Column V, indicates 200 mile maximum range at zero wind for 40 gallons. Sixty-nine gallons will allow approximately 350 miles. At 15,000 feet the TAS would be 261 mph. Ground speed would be the same or dependent upon wind. The time for flight is $250/261 = .96$ hours. Fuel required would be $53 \text{ gph} \times .96 \text{ hours} = 51$ gallons. This would leave 18 gallons in the tanks upon arrival at the alternate field, i.e., $69 - 51 = 18$ gallons. A slight advantage would be obtained by dropping external tanks and flying according to operating conditions as listed for the "clean" airplane on figure 52.

AN 01-60JE-1

For use with V-1650-7 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND K		ENGINE MODEL(S) V-1650-7																													
TAKE-OFF, CLIMB & LANDING CHART																															
TAKE-OFF DISTANCE FEET																															
GROSS WEIGHT LB.	HEAD WIND M.P.H., KTS.	HARD SURFACE RUNWAY					SOFT SURFACE RUNWAY																								
		AT SEA LEVEL		AT 6000 FEET		AT 3000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET																			
		GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.																		
11,000	0	1800	2700	2000	2300	3300	2000	2800	2100	3100	2400	3400	2800	3900																	
	17	15	1400	2100	1500	1800	2600	2200	2500	2700	2200	2500	2700	3100																	
	34	30	1600	1600	1300	1300	1100	1700	1200	1200	1200	1400	2100	2400																	
10,000	0	1600	2400	1800	2000	2800	1700	2400	1800	2600	2100	2900	2400	3200																	
	17	15	1400	2000	1500	1800	2300	1900	2100	1600	2300	1800	2500	2500																	
	34	30	1600	1600	1300	1300	1100	1700	1200	1200	1200	1400	2100	2400																	
9000	0	1400	2000	1500	1700	2500	1400	2100	1600	2300	1800	2500	2000	2800																	
	17	15	1000	1600	1200	1700	1300	2000	1100	1800	1400	2000	1500	2200																	
	34	30	1200	1200	800	1300	1000	1600	900	1500	1000	1600	1100	1700																	
NOTE: INCREASE CHART DISTANCES AS FOLLOWS: 75°F + 10%; 100°F + 20%; 125°F + 30%; 150°F + 40% DATA AS OF 8-20-44																															
CLIMB DATA																															
GROSS WEIGHT LB.	BEST I.A.S. MPH	RATE OF CLIMB F.P.M.	AT 5000 FEET		AT 10,000 FEET		AT 15,000 FEET		AT 25,000 FEET		AT 35,000 FEET																				
			BEST I.A.S. MPH	RATE OF CLIMB F.P.M.	BEST I.A.S. MPH	RATE OF CLIMB F.P.M.	BEST I.A.S. MPH	RATE OF CLIMB F.P.M.	BEST I.A.S. MPH	RATE OF CLIMB F.P.M.	BEST I.A.S. MPH	RATE OF CLIMB F.P.M.																			
			TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED																			
11,000	175	150	1450	15	175	150	1500	6.8	26	170	150	1450	10.5	31	165	145	1100	19	44	145	130	150	39	76							
10,000	175	150	1750	15	175	150	1750	5.6	24	170	150	1800	8.5	29	165	145	1400	15	40	145	130	450	27	58							
9000	175	150	2050	15	175	150	2100	4.8	23	170	150	2150	7.5	27	165	145	1800	13	36	145	130	750	20	48							
POWER PLANT SETTINGS: (DETAILS ON FIG. 29, SECTION 1111); MAX. CONTINUOUS POWER DATA AS OF 2-26-47 BASED ON: FUEL USED (U.S. GALL.) INCLUDES WARM-UP & TAKE-OFF ALLOWANCE																															
LANDING DISTANCE FEET																															
GROSS WEIGHT LB.	BEST IAS APPROACH		HARD DRY SURFACE					FIRM DRY SOD					WET OR SLIPPERY																		
	POWER OFF	POWER ON	AT SEA LEVEL	AT 3000 FEET	AT 6000 FEET	AT SEA LEVEL	AT 3000 FEET	AT 6000 FEET	AT SEA LEVEL	AT 3000 FEET	AT 6000 FEET	AT SEA LEVEL	AT 3000 FEET	AT 6000 FEET	AT SEA LEVEL	AT 3000 FEET	AT 6000 FEET														
	MPH	KTS	GROUND 50' OBL.	TO CLEAR 50' OBL.	ROLL	GROUND 50' OBL.	TO CLEAR 50' OBL.	ROLL	GROUND 50' OBL.	TO CLEAR 50' OBL.	ROLL	GROUND 50' OBL.	TO CLEAR 50' OBL.	ROLL	GROUND 50' OBL.	TO CLEAR 50' OBL.	ROLL														
10,000	130	115	130	115	130	2500	1600	1700	2800	1500	2600	1700	2800	1900	3000	4800	3900	5100	4400	4400	3900	5100	4400	5500							
9000	130	115	120	105	120	2400	1500	1600	2700	1400	2400	1600	2600	1700	2800	3500	3300	4300	3600	4300	3300	4300	3600	4600							
8000	130	115	110	95	110	2300	1400	1500	2600	1300	2200	1400	2400	1500	2600	2800	2600	3600	3100	3600	2600	3600	3100	4000							
DATA AS OF 8-20-44												FLIGHT TESTS										BASED ON: OPTIMUM LANDING IS BOX OF CHART VALUES									
REMARKS:												LEGEND										I.A.S.: INDICATED AIRSPEED M.P.H.: MILES PER HOUR KTS.: KNOTS F.P.M.: FEET PER MINUTE									
NOTE: TO DETERMINE FUEL CONSUMPTION IN BRITISH IMPERIAL GALLONS, MULTIPLY BY 10, THEN DIVIDE BY 12																															

For use with V-1650-7 engine only regardless of airplane model.

Figure 51—Take-off, Climb, and Landing Chart

For use with V-1650-7 engine only regardless of airplane model.

AN 01-60JE-1

For use with V-1650-7 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D & K				FLIGHT OPERATION INSTRUCTION CHART				EXTERNAL LOAD ITEMS WING RACKS ONLY			
ENGINE(S): V-1650-7				CHART WEIGHT LIMITS: 10,200 TO 8,000 POUNDS							
LIMITS	RPM	M.P.	BLOWER POSITION	MIXTURE	TIME	WING RACKS	WING RACKS	WING RACKS	WING RACKS	WING RACKS	WING RACKS
WAR	3000	67	LOW	RUN	5	13500	210	13500	210	13500	210
EMERG.			HIGH		min.						
MILITARY	3000	61	LOW	RUN	15	13500	180	13500	180	13500	180
POWER			HIGH		min.						
COLUMN I				COLUMN II				COLUMN III			
RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES			
STATUTE	NAUTICAL	U.S.	GAL.	STATUTE	NAUTICAL	U.S.	GAL.	STATUTE	NAUTICAL	U.S.	GAL.
950	825	269	269	920	800	269	269	920	800	269	269
880	765	240	240	855	710	240	240	855	710	240	240
805	700	220	220	780	645	220	220	780	645	220	220
730	635	200	200	710	570	200	200	710	570	200	200
640	555	180	180	645	500	180	180	645	500	180	180
585	510	160	160	570	425	160	160	570	425	160	160
515	445	140	140	500	355	140	140	500	355	140	140
440	380	120	120	425	285	120	120	425	285	120	120
365	315	100	100	355	215	100	100	355	215	100	100
295	255	80	80	285	145	80	80	285	145	80	80
220	190	60	60	215	80	60	60	215	80	60	60
145	125	40	40	145	15	40	40	145	15	40	40
75	65	20	20	75		20	20	75		20	20
MAXIMUM CONTINUOUS				PRESS				PRESS			
M.P.	MIX-TURE	TOT.	T.A.S.	M.P.	MIX-TURE	TOT.	T.A.S.	M.P.	MIX-TURE	TOT.	T.A.S.
INCHES		MPH	KTS.	INCHES		MPH	KTS.	INCHES		MPH	KTS.
SEE COLUMN I				40000				40000			
SEE COLUMN I				35000				35000			
SEE COLUMN I				30000				30000			
2700	46	103	384	334	2500	46	103	334	2500	46	103
2700	46	98	361	314	2500	46	98	314	2500	46	98
2700	46	91	339	284	2500	46	91	284	2500	46	91
2700	46	86	315	274	2500	46	86	274	2500	46	86
SPECIAL NOTES				EXAMPLE				LEGEND			
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 51)				AT 9,500 LB. GROSS WEIGHT WITH 80 GAL. OF FUEL				ALT. : PRESSURE ALTITUDE			
(2) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.				(AFTER DEDUCTING TOTAL ALLOWANCES OF 20 GAL.)				M.P. : MANIFOLD PRESSURE			
HIGH BLOWER ABOVE HEAVY WING.				TO FLY 350 STAT. AIRMILES AT 5000 FT. ALTITUDE				GPM : U.S. GAL. PER HOUR			
				MAINTAIN 2500 RPM AND 43 IN. MANIFOLD PRESSURE				TAS : TRUE AIRSPEED			
				WITH MIXTURE SET: RUN.				KTS. : KNOTS			
								S.L. : SEA LEVEL			
								F.T. : FULL THROTTLE			
								SEE COLUMN IV			

For use with V-1650-7 engine only regardless of airplane model.

FLIGHT OPERATION INSTRUCTION CHART

EXTERNAL LOAD ITEMS
TWO 500 LB. BOMBS
OR TWO 75 GAL. WING TANKS

CHART WEIGHT LIMITS: 11,200 TO 9,800 POUNDS

AIRCRAFT MODEL(S)
P-51D & K

ENGINE(S): V-1650-7

SPECIAL NOTES

- (1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 51)
PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.
- (2) MAX. FUEL CAPACITY WITH 2-75 GAL. WING, ST'D. WING TANKS
& FUSELAGE TANKS,
HIGH BLOWER ABOVE HEAVY LINE

EXAMPLE

AT 10000 LB. GROSS WEIGHT WITH 210 GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF 20 GAL.)
TO FLY 850 STAT. MILES AT 5000 FT. ALTITUDE
MAINTAIN 2300 RPM AND 41 IN. MANIFOLD PRESSURE
WITH MIXTURE SET: RUN. WHEN WEIGHT REACHES
9,800 LBS. USE POWER SETTINGS SHEET 2, COLUMN 111.

LÉGENDE

MALT. :	PRESSURE ALTITUDE	F.R. :	FULL RICH
M.P. :	MANIFOLD PRESSURE	A.R. :	AUTO-RICH
GPM :	U.S.GAL.PER HOUR	A.L. :	AUTO-LEAN
TAS :	TRUE AIRSPEED	C.L. :	CRUISING LEAN
KTS. :	KNOTS	M.L. :	MANUAL LEAN
S.L. :	SEA LEVEL	F.T. :	FULL THROTTLE

For use with V-1650-7 engine only regardless of airplane model.

Figure 53 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

[illegible]

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

Figure 53 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart

For use with V-1650-7 engine only regardless of airplane model.

[illegible]

For use with V-1650-7 engine only regardless of airplane model.

Figure 54 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart

For use with V-1650-7 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D & K										FLIGHT OPERATION INSTRUCTION CHART										ENGINE(S): V-1650-7										CHART WEIGHT LIMITS: 11,000 TO 8,900 POUNDS										EXTERNAL LOAD ITEMS 6 MILES + 2-75 GAL. WING TANKS OR 6 MILES + 2-100 GAL. WING TANKS OR 6 MILES + 1000 LBS. BODY BOMB									
LIMITS		RPM		M.P.		BLOWER		MIXTURE		TIME		COOL. TEMP.		TOTAL		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) DEAR RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.		NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILS PER GALLON (MI./GAL.) (NO WIND), GALLONS PER MI. (G.P.M.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND) TO OBTAIN BRITISH IMPERIAL GAL. (G & P.M.): MULTIPLY U.S. GAL. (G & P.M.) BY 10 THEN DIVIDE BY 12.		COLUMN I		COLUMN II		COLUMN III		COLUMN IV		COLUMN V																					
WAR		3000		67		LOW		RUN		5		135°		210																																			
EMERG.		"		"		HIGH		"		min.		"		"																																			
MILITARY		3000		61		LOW		RUN		15		135°		180																																			
POWER		"		"		HIGH		"		min.		"		"																																			
1040		905		1170		1065		330		1170		1015		1285		1115		1400		1220		1140		1220		1110		1400		1220		1140		1220															
855		745		980		835		270		980		835		1050		910		1150		1000		910		1000		885		1020		915		1025		915															
760		660		850		740		210		745		645		820		715		895		775		645		775		895		715		895		795		795															
665		580		640		555		180		640		555		700		610		765		665		555		665		555		765		680		680		680															
520		450		530		460		150		530		460		585		510		635		550		460		550		460		635		570		570		570															
475		415		425		370		120		425		370		470		410		510		445		370		445		370		510		455		455		455															
380		330		320		280		90		320		280		350		305		360		330		280		330		280		360		260		260		260															
285		250		215		185		60		215		185		235		205		255		220		190		220		190		255		226		226		226															
190		165		105		91		30		105		91		115		100		125		110		95		110		95		125		130		130		130															
95		83																																															
MAXIMUM CONTINUOUS		PRESS		ALT.		PRESS		ALT.		PRESS		ALT.		PRESS		ALT.		PRESS		ALT.		PRESS		ALT.		PRESS		ALT.		PRESS		ALT.		PRESS															
M.P.		MIX-TURE		T.A.S.		M.P.		MIX-TURE		T.A.S.		M.P.		MIX-TURE		T.A.S.		M.P.		MIX-TURE		T.A.S.		M.P.		MIX-TURE		T.A.S.		M.P.		MIX-TURE		T.A.S.															
INCHES		TURE		KTS.		INCHES		TURE		KTS.		INCHES		TURE		KTS.		INCHES		TURE		KTS.		INCHES		TURE		KTS.		INCHES		TURE		KTS.															
40000		35000		30000		40000		35000		30000		40000		35000		30000		40000		35000		30000		40000		35000		30000		40000		35000		30000															
25000		20000		15000		25000		20000		15000		25000		20000		15000		25000		20000		15000		25000		20000		15000		25000		20000		15000															
103		332		288		103		332		288		103		332		288		103		332		288		103		332		288		103		332		288															
46		RUN		46		RUN		46		RUN		46		RUN		46		RUN		46		RUN		46		RUN		46		RUN		46		RUN															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46		2700		46															
2700		46		2700		46		2700		46		2700		46		2700		46																															

For use with V-1650-7 engine only regardless of airplane model.

Figure 54 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart

For use with V-1650-7 engine only regardless of airplane model.

AN 01-60JE-1

For use with V-1650-7 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-61D & K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS OR ONE 1000 GPM. * ONE 110 GALL. W. TANK OR TWO 110 GALL. WING TANKS (OR TEN 5" ROCKETS)									
ENGINE(S): V-1650-7										CHART WEIGHT LIMITS: 12,200 TO 10,300 POUNDS										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS 1, 11, 11V AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (M.P./GAL.) (NO WIND), GALLONS PER HOUR (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND) TO OBTAIN BRITISH IMPERIAL GALL. (OR G.P.H.): MULTIPLY U.S.GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.									
LIMITS										INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMNS EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										FUEL									
WAR										COLD. T. TOTAL										COLD. T. TOTAL									
ENERG.										M.P. (R.P.M.)										M.P. (R.P.M.)									
MILITARY 3000										5 min.										15 min.									
POWER										HIGH										HIGH									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									
COLD. T. TOTAL										COLD. T. TOTAL										COLD. T. TOTAL									

For use with V-1650-7 engine only regardless of airplane model.

AIRCRAFT MODEL (S) P-51D & K				FLIGHT OPERATION INSTRUCTION CHART				EXTERNAL LOAD ITEMS (OR ONE 1000 LBS. + ONE 100 GAL. M. TANK OR TWO 100 GAL. M. TANKS (OR TEN 55 "ROCKETS")																							
ENGINE (S): V-1650-7				CHART WEIGHT LIMITS: 10,300 TO 8,100 POUNDS																											
LIMITS	M.P.	BLOWER RPM.	MIXTURE	TIME POSITION	FUEL LIMIT TEMP. C.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.																									
WAR	EMERG.	MILITARY	POWER	M.P.	BLOWER RPM.	MIXTURE	TIME POSITION	FUEL LIMIT TEMP. C.P.H.																							
1330	1195	1060	930	795	665	530	400	265	135	115	100	85	70	55	40	25															
COLUMN I				COLUMN II				COLUMN III				COLUMN IV				COLUMN V															
RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES															
STATUTE				STATUTE				STATUTE				STATUTE				STATUTE															
NAUTICAL				NAUTICAL				NAUTICAL				NAUTICAL				NAUTICAL															
FUEL				FUEL				FUEL				FUEL				FUEL															
U.S.				U.S.				U.S.				U.S.				U.S.															
GAL.				GAL.				GAL.				GAL.				GAL.															
1720				1720				1720				1720				1720															
1545				1545				1545				1545				1545															
1380				1380				1380				1380				1380															
1205				1205				1205				1205				1205															
1035																															

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

Figure 55 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart

Figures 56-63, pages 61-74, deleted in revision, dated 7 May 1947

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K		TAKE-OFF, CLIMB & LANDING CHART TAKE-OFF DISTANCE FEET										ENGINE MODEL(S) V-1650-3									
GROSS WEIGHT LB.	HEAD WIND M.P.H.	HARD SURFACE RUNWAY					SOFT-TURF RUNWAY					SOFT SURFACE RUNWAY									
		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT 10,000 FEET		AT 15,000 FEET		AT 20,000 FEET		AT 25,000 FEET		AT 3000 FEET		AT 6000 FEET		AT 10,000 FEET	
		GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.
9000	0	1350	2000	1500	2200	1700	2450	1450	2100	1600	2250	1800	2500	1600	2250	1750	2450	1500	2200	1600	2250
	17	15	1000	1550	1700	1300	1950	1050	1600	1200	1800	1350	2000	1200	1850	1350	1950	1500	2000	1200	1850
	34	30	750	1150	800	950	1500	750	1200	850	1350	1000	1550	850	1300	950	1400	1100	1650	850	1300
11,000	0	1850	2700	2000	2950	2250	3300	1950	2800	2100	3050	2600	3400	2150	3000	2100	3000	2300	3100	2150	3000
	17	15	1350	2150	1500	2300	1750	1450	2300	1600	2450	1400	2300	1350	2200	1400	2300	1600	2300	1350	2200
	34	30	950	1600	1100	1300	2050	1050	1650	1200	1850	1150	1900	1100	1750	1150	1900	1400	2050	1100	1750
13,000	0	2300	3600	2500	3800	2800	4300	2450	3700	2650	3950	3000	4550	2900	4300	3200	4800	3600	5300	2900	4300
	17	15	1800	2600	1900	2800	2200	1850	2700	2050	2950	2400	3250	2300	3200	2400	3250	2700	3600	2400	3250
	34	30	1200	2050	1400	2300	1650	1350	2150	1500	2400	1750	2600	1650	2500	1750	2600	2000	2900	1750	2600
NOTE: INCREASE CHART DISTANCES AS FOLLOWS: 20% + 10% 1000' + 20% 1250' + 30% 1500' + 40% DATA AS OF 5-8-45																					
CLIMB DATA																					
GROSS WEIGHT LB.	AT SEA LEVEL	AT 5000 FEET		AT 10,000 FEET		AT 15,000 FEET		AT 20,000 FEET		AT 25,000 FEET											
		BEST I.A.S. KTS	RATE OF CLIMB F.P.M.	BEST I.A.S. KTS	RATE OF CLIMB F.P.M.	BEST I.A.S. KTS	RATE OF CLIMB F.P.M.	BEST I.A.S. KTS	RATE OF CLIMB F.P.M.	BEST I.A.S. KTS	RATE OF CLIMB F.P.M.	BEST I.A.S. KTS	RATE OF CLIMB F.P.M.	BEST I.A.S. KTS	RATE OF CLIMB F.P.M.	BEST I.A.S. KTS	RATE OF CLIMB F.P.M.	BEST I.A.S. KTS	RATE OF CLIMB F.P.M.	BEST I.A.S. KTS	RATE OF CLIMB F.P.M.
		TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED	TIME MIN.	FUEL USED
9000	170	145	2200	15	170	145	2250	5.0	23	170	145	2250	7.5	27	165	145	1900	10.0	31	160	140
	170	145	1500	15	170	145	1500	7.0	26	170	145	1500	10.5	32	165	145	1150	14.0	39	160	140
	175	150	1000	15	175	150	900	11.0	32	175	150	850	17.0	42	170	145	550	23.0	55	165	145
11,000	170	145	2200	15	170	145	2200	2.5	19	170	145	2200	5.0	23	170	145	1900	10.0	31	160	140
	170	145	1500	15	170	145	1500	3.5	20	170	145	1500	7.0	26	170	145	1150	14.0	39	160	140
	175	150	1000	15	175	150	950	5.5	23	175	150	900	11.0	32	175	150	850	17.0	42	170	145
13,000	170	145	2200	15	170	145	2200	2.5	19	170	145	2200	5.0	23	170	145	1900	10.0	31	160	140
	170	145	1500	15	170	145	1500	3.5	20	170	145	1500	7.0	26	170	145	1150	14.0	39	160	140
	175	150	1000	15	175	150	950	5.5	23	175	150	900	11.0	32	175	150	850	17.0	42	170	145
POWER PLANT SETTINGS: DETAILS ON FIG. SECTION 1111; DATA AS OF 5-8-45																					
LANDING DISTANCE FEET																					
GROSS WEIGHT LB.	BEST IAS APPROACH POWER OFF	HARD DRY SURFACE					FIRM DRY SOO					NET OR SLIPPERY									
		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT 10,000 FEET		AT 15,000 FEET		AT 20,000 FEET		AT 25,000 FEET		AT 3000 FEET		AT 6000 FEET		AT 10,000 FEET	
		GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.	GROUND 50' OBL.	TO CLEAR 50' OBL.
9000	130	115	130	115	1200	2300	1400	1400	1500	2600	1400	2400	1400	1600	2600	1400	1700	2800	1500	2600	1500
	130	115	130	115	1200	2300	1400	1400	1500	2600	1400	2400	1400	1600	2600	1400	1700	2800	1500	2600	1500
	130	115	130	115	1200	2300	1400	1400	1500	2600	1400	2400	1400	1600	2600	1400	1700	2800	1500	2600	1500
11,000	130	115	130	115	1200	2300	1400	1400	1500	2600	1400	2400	1400	1600	2600	1400	1700	2800	1500	2600	1500
	130	115	130	115	1200	2300	1400	1400	1500	2600	1400	2400	1400	1600	2600	1400	1700	2800	1500	2600	1500
	130	115	130	115	1200	2300	1400	1400	1500	2600	1400	2400	1400	1600	2600	1400	1700	2800	1500	2600	1500
13,000	130	115	130	115	1200	2300	1400	1400	1500	2600	1400	2400	1400	1600	2600	1400	1700	2800	1500	2600	1500
	130	115	130	115	1200	2300	1400	1400	1500	2600	1400	2400	1400	1600	2600	1400	1700	2800	1500	2600	1500
	130	115	130	115	1200	2300	1400	1400	1500	2600	1400	2400	1400	1600	2600	1400	1700	2800	1500	2600	1500
NOTE: INCREASE CHART DISTANCES AS FOLLOWS: 20% + 10% 1000' + 20% 1250' + 30% 1500' + 40% DATA AS OF 5-8-45																					
LEGEND																					
MIXTURE: USE "RUN" OR "AUTO RICH - AUTO LEAN"																					
NOTE: TO DETERMINE FUEL CONSUMPTION IN BRITISH IMPERIAL GALLONS, MULTIPLY BY 10, THEN DIVIDE BY 12																					
REMARKS:																					

For use with V-1650-3 engine only regardless of airplane model.

Figure 64—Take-off, Climb and Landing Chart

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS WING RACKS									
ENGINE(S): V-1650-3										CHART WEIGHT LIMITS: 10,000 TO 8500 POUNDS																			
LIMITS		M.P.		BLOWER MIXTURE		TIME		CYL. TOTAL		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. EQUAL																			

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AFC-528
8-1-48

AIRCRAFT MODEL(S)
P-51D AND P-51K
ENGINE(S): V-1650-3

FLIGHT OPERATION INSTRUCTION CHART
CHART WEIGHT LIMITS: 11,000 TO 10,000 POUNDS

EXTERNAL LOAD ITEMS
2 - 500-POUND WING BOMBS

LIMITS	M.P.H. IN. NO.	BLOWER POSITION	MIXTURE TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HOUR (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND) TO OBTAIN BRITISH IMPERIAL GAL (OR G.P.H.) MULTIPLY U.S. GAL (OR G.P.H.) BY 10 THEN DIVIDE BY 12.		
WAR EMERG.	3000	67	LOW HIGH	5 MIN.	187 193			
MILITARY POWER	3000	61	LOW HIGH	15 MIN.	187 193			

COLUMN I			COLUMN II			COLUMN III			COLUMN IV			COLUMN V		
RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES		
STATUTE			STATUTE			STATUTE			STATUTE			STATUTE		
790		680	1000		870	1200		1040	1380		1180	289		1440
700		610	900		760	1070		930	1230		1060	240		1280
640		560	830		720	980		850	1130		980	220		1180
590		510	750		650	900		770	1020		890	200		1080
530		460	680		590	810		700	920		800	180		980
470		410	610		530	720		620	820		710	160		870
MAXIMUM CONTINUOUS			(3.6 STAT. (8. KM) AUT.) MI./GAL.			(4.5 STAT. (8.45 NAUT.) MI./GAL.)			(5.1 STAT. (8.45 NAUT.) MI./GAL.)			PRESS		
M.P.H. R.P.M.	MIX-TURE INCHES	APPROX. TOT. T.A.S.	ALT. FEET	PRESS	M.P.H. R.P.M.	MIX-TURE INCHES	APPROX. TOT. T.A.S.	ALT. FEET	PRESS	M.P.H. R.P.M.	MIX-TURE INCHES	APPROX. TOT. T.A.S.	ALT. FEET	PRESS
2700	46	RUN 96	360	310	25000									
2700	46	RUN 119	370	320	20000	2550	310	25000						
2700	46	RUN 115	350	305	15000	2400	290	15000						
2700	46	RUN 110	330	285	10000	2350	275	10000						
2700	46	RUN 106	310	270	5000	2250	255	5000						
2700	46	RUN 101	295	255	S.L.	2100	245	S.L.						

SPECIAL NOTES

(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.)
PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.

EXAMPLE

AT 11,000 LB. GROSS WEIGHT WITH 289 GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF 49 GAL.)
TO FLY 1000 STAT. AIRMILES AT 20,000 FT. ALTITUDE
MAINTAIN 2050 RPM AND 67 IN. MANIFOLD PRESSURE
WITH MIXTURE SET: RUN

LEGEND

ALT. : PRESSURE ALTITUDE
M.P. : MANIFOLD PRESSURE
GPH : U.S. GAL. PER HOUR
TAS : TRUE AIRSPEED
KTS. : KNOTS
S.L. : SEA LEVEL
F.R. : FULL RICH
A.R. : AUTO-RICH
A.L. : AUTO-LEAN
C.L. : CRUISING LEAN
M.L. : MANUAL LEAN
F.T. : FULL THROTTLE

HIGH BLOWER ABOVE HEAVY LINE

DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA

For use with V-1650-3 engine only regardless of airplane model.

Figure 66 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—Two 500-pound Bombs

AN 01-60JE-1

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K		FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 2 - 500-LB. WING BOMBS	
ENGINE(S): V-1650-3		CHART WEIGHT LIMITS: 10,400 TO 9400 POUNDS											
LIMITS	RPM	M.P. POSITION		CYL. LIMIT	TOTAL G.P.H.	M.P. POSITION		CYL. LIMIT	TOTAL G.P.H.	M.P. POSITION		CYL. LIMIT	TOTAL G.P.H.
		LOW	HIGH			LOW	HIGH			LOW	HIGH		
WAR	3000	67	108	MIN	187	67	108	MIN	187	67	108	MIN	187
EMERGENCY	3000	61	108	MIN	167	61	108	MIN	167	61	108	MIN	167
MILITARY POWER	3000	61	108	MIN	153	61	108	MIN	153	61	108	MIN	153

COLUMN I		COLUMN II		COLUMN III		COLUMN IV		COLUMN V	
RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES	
STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL
SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽¹⁾									
540	470	700	610	830	720	950	820	1000	860
470	410	610	530	720	620	820	710	870	750
410	360	530	460	630	540	720	630	760	660
360	300	460	400	540	470	620	540	650	560
300	250	400	330	450	390	510	450	540	470
250	200	330	260	360	310	410	360	430	380
200	150	230	200	270	230	310	270	320	280
150	100	150	130	180	160	210	180	220	190
100	50	80	70	90	80	100	90	110	90

MAXIMUM CONTINUOUS		(3.8 STAT. (3.3 NAUT.)) MI./GAL.		(4.5 STAT. (3.9 NAUT.)) MI./GAL.		(5.1 STAT. (4.4 NAUT.)) MI./GAL.		PRESS	
R.P.M.	MIX-TURE	TOT. GPH.	T.A.S. MPH.	R.P.M.	MIX-TURE	TOT. GPH.	T.A.S. MPH.	ALT. FEET	ALT. FEET
2700	46	RUN	96	365	315	25000	315	25000	25000
2700	46	RUN	119	370	320	20000	320	20000	20000
2700	46	RUN	115	350	305	15000	305	15000	15000
2700	46	RUN	110	330	285	10000	285	10000	10000
2700	46	RUN	106	310	270	5000	270	5000	5000
2700	46	RUN	101	295	265	S.L.	265	S.L.	S.L.

MAXIMUM AIR RANGE		PRESS		ALT. FEET		ALT. FEET		ALT. FEET	
R.P.M.	MIX-TURE	TOT. GPH.	T.A.S. MPH.	R.P.M.	MIX-TURE	TOT. GPH.	T.A.S. MPH.	R.P.M.	MIX-TURE
2700	46	RUN	96	365	315	25000	315	25000	315
2700	46	RUN	119	370	320	20000	320	20000	320
2700	46	RUN	115	350	305	15000	305	15000	305
2700	46	RUN	110	330	285	10000	285	10000	285
2700	46	RUN	106	310	270	5000	270	5000	270
2700	46	RUN	101	295	265	S.L.	265	S.L.	S.L.

LEGEND		EXAMPLE		SPECIAL NOTES	
ALT. : PRESSURE ALTITUDE	F.P. : FULL RICH	AT 10,000 LB. GROSS WEIGHT WITH 140 GAL. OF FUEL		(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 1)	
M.P. : MANIFOLD PRESSURE	A.P. : AUTO-RICH	(AFTER DEDUCTING TOTAL ALLOWANCES OF 44 GAL.)		PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.	
GPH. : U.S. GAL. PER HOUR	A.L. : AUTO-LEAN	TO FLY 700 STAT. AIRMILES AT 20,000 FT. ALTITUDE		HIGH BLOWER ABOVE HEAVY LINE	
TAS : TRUE AIRSPEED	C.L. : CRUISING LEAN	MAINTAIN 2000 RPM AND 6.1 IN. MANIFOLD PRESSURE			
KTS. : KNOTS	M.L. : MANUAL LEAN	WITH MIXTURE SET: 100			
S.L. : SEA LEVEL	F.T. : FULL THROTTLE				

For use with V-1650-3 engine only regardless of airplane model.

Figure 66 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart—Two 500-pound Bombs

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 2 1000-POUND BOMBS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
ENGINE(S): V-1800-3										CHART WEIGHT LIMITS: 12,000 TO 11,400 POUNDS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
LIMITS		RPM.		M.P.		BLOWER MIXTURE POSITION		TIME CYC. LIMIT		TOTAL G.P.H.		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR VALUE TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE BEARST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN 1 IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS 11, 111, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER MI. (G.P.M.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND) TO OBTAIN BRITISH IMPERIAL GAL (OR G.P.M.): MULTIPLY U.S. GAL (OR G.P.M.) BY 10 THEN DIVIDE BY 12.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
WAR EMERG.		3000		67		LOW		5		107																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
MILITARY POWER		3000		61		LOW		15		103																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
										COLUMN I										COLUMN II										COLUMN III										COLUMN IV										COLUMN V																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
STATUTE										STATUTE										STATUTE										STATUTE										STATUTE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
NAUTICAL										NAUTICAL										NAUTICAL										NAUTICAL										NAUTICAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
770										670										269										1170										1010										1299										1120										289										1380										1180																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
600										600										240										1040										900										1160										1010										240										1210										1050																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
630										550										220										960										820										1060										920										220										1120										970																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
570										490										200										860										750										970										840										200										1020										860																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
520										450										180										770										670										870										750										180										920										800																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
460										380										160										680										590										780										660										160										820										710																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
MAXIMUM CONTINUOUS										PRESS										(3.5 STAT. (3.05 NAUT.) MI./GAL.)										(N.I. STAT. @ 55 NAUT.) MI./GAL.)										(N.I. STAT. @ 55 NAUT.) MI./GAL.)										PRESS										MAXIMUM AIR RANGE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
M.P. INCHES										ALT. FEET										M.P. INCHES										R.P.M.										M.P. INCHES										R.P.M.										M.P. INCHES										R.P.M.										M.P. INCHES										R.P.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
T.O.T. T.A.S. KTS.										T.O.T. T.A.S. KTS.										T.O.T. T.A.S. KTS.										T.O.T. T.A.S. KTS.										T.O.T. T.A.S. KTS.										T.O.T. T.A.S. KTS.										T.O.T. T.A.S. KTS.										T.O.T. T.A.S. KTS.										T.O.T. T.A.S. KTS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
40000										35000										30000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

For use with V-1650-3 engine only regardless of airplane model.

AN 01-60JE-1

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D, AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 2 - 1000-LB. BOMBS																																																											
ENGINE(S): V-1650-3										CHART WEIGHT LIMITS: 11,400 TO 10,400 POUNDS																																																																					
LIMITS		RPM		M.P.		MIXTURE POSITION		TIME LIMIT		CYL. TEMP.		TOTAL G.P.H.		NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (M.P./GAL.) (NO WIND), GALLONS PER HOUR (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND) ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL (OR G.P.H.): MULTIPLY U.S. GAL (OR G.P.H.) BY 10 THEN DIVIDE BY 12.																																																																	
WAR		3000		67		LOW		HIGH		5		187		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.																																																																	
MILITARY		3000		61		LOW		HIGH		15		167																																																																			
POWER																																																																															
COLUMN I										COLUMN II										COLUMN III										COLUMN IV										COLUMN V																																							
RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES																																							
STATUTE										STATUTE										STATUTE										STATUTE										STATUTE																																							
NAUTICAL										NAUTICAL										NAUTICAL										NAUTICAL										NAUTICAL																																							
530										440										184										184										184										184																													
460										360										160										160										160										160																													
400										340										140										140										140										140																													
340										290										120										120										120										120																													
290										240										100										100										100										100																													
230										190										80										80										80										80																													
170										140										60										60										60										60																													
110										110										40										40										40										40																													
60										50										20										20										20										20																													
MAXIMUM CONTINUOUS										PRESS										PRESS										PRESS										PRESS																																							
M.P. MIX-TURE										ALT.										ALT.										ALT.										ALT.																																							
INCHES										FEET										FEET										FEET										FEET																																							
R.P.M.										T.A.S.										T.A.S.										T.A.S.										T.A.S.																																							
TOT. GPH.										MPL.										MPL.										MPL.										MPL.																																							
2700										96										355										310										25000										25000																													
2700										46										119										365										315										20000										20000																			
2700										46										115										395										300										15000										15000																			
2700										46										110										325										280										10000										10000																			
2700										46										108										305										265										5000										5000																			
2700										46										101										290										250										S.L.										S.L.																			
2700										46										100										245										205										185										185																			
2700										46										98										235										160										1600										1600																			
2700										46										94										250										1850										36										36																			
2700										46										84										290										250										1850										36										36									
2700										46										77										275										240										1850										37										37									
2700										46										74										310										270										1950										F.T.										F.T.									
2700										46										70										330										285										2100										F.T.										F.T.									
2700										46										62										260										225										1850										235										235									
2700										46										58										280										245										2000										245										245									
2700										46										54										260										225										10000										1600										1600									
2700										46										51										245										210										5000										1600										1600									
2700										46										48										235										205										S.L.										S.L.										S.L.									
2700										46										44										225										195										185										185										185									
2700										46										42										215										185										1600										1600										1600									
2700										46										40										200										180										100										100										100									
2700										46										380										610										530										530										530																			
2700										46										420										440										440										440										440																			
2700										46										390										390										390										390										390																			
2700										46										370										370										370										370										370																			
2700										46										340										340										340										340										340																			
2700										46										310										310										310										310										310																			
2700										46										290										290										290										290										290																			
2700										46										250										250										250										250										250																			
2700										46										220										220										220										220										220																			
2700										46										190										190										190										190										190																			
2700										46										170										170										170										170										170																			
2700										46										150										150										150										150										150																			
2700										46										130										130										130										130										130																			
2700										46										110										110										110										110										110																			
2700										46										90										90										90										90										90																			
2700										46										70										70										70										70										70																			
2700										46										50										50										50										50										50																			
2700										46										30										30										30										30										30																			
2700										46										10										10										10										10										10																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0										0																			
2700										46										0										0										0										0																													

For use with V-1650-3 engine only regardless of airplane model.

Figure 68 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—Two 75-gallon Tanks

For use with V-1650-3 engine only regardless of airplane model.

Figure 68 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart—Two 75-gallon Tanks

For use with V-1650-3 engine only regardless of airplane model.

[illegible]

For use with V-1650-3 engine only regardless of airplane model.

Figure 69 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—Two 110-gallon Tanks

AN 01-60JE-1

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K				FLIGHT OPERATION INSTRUCTION CHART				EXTERNAL LOAD ITEMS 2 - 110-GALLON COMBAT TANKS							
ENGINE(S): V-1650-3				CHART WEIGHT LIMITS: 10,200 TO 8000 POUNDS											
LIMITS	RPM	M.P. IN HG.	CYL. POSITION	TIME LIMIT	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.									
						(FIG. 100 SEE POWER PLANT CHART FOR DETAILS)									
						M.P. MIN. 153									
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER				MILITARY POWER			
MILITARY POWER				MILITARY POWER				MILITARY POWER							

AN 01-60JE-1

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 10 ROCKETS											
ENGINE(S): V-1050-3										CHART WEIGHT LIMITS: 10,600 TO 9000 POUNDS																					
LIMITS		RPM		M.P.		BLOWER MIXTURE		TIME		CYL.		TOTAL		C.G.		TEMP.		G.P.H.		FUEL		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES	
WAR	EMERG.	3000	67	LOW	HIGH	5	187	187	187	187	187	187	187	187	187	187	187	187	187	269	240	1080	930	830	1100	1080	960	269	1300	1130	1010
MILITARY	POWER	3000	61	LOW	HIGH	15	167	167	167	167	167	167	167	167	167	167	167	167	167	220	200	880	800	720	1010	880	800	220	1060	920	840
																				180	160	640	560	490	550	740	640	180	770	670	500
																				120	100	380	340	290	320	370	320	100	880	780	600
																				80	60	280	240	210	280	320	240	80	680	590	500
																				40	30	160	140	110	180	200	160	40	380	340	250
																				130	110	460	400	340	490	550	400	100	880	780	600
																				100	80	330	280	240	320	370	320	100	880	780	600
																				60	40	280	240	210	280	320	240	80	680	590	500
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
																				130	110	460	400	340	490	550	400	100	880	780	600
											</																				

SPECIAL NOTES

- (1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 1)
PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.

HIGH BLOWER ABOVE HEAVY LINE

EXAMPLE

AT 10,500 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF 40 GAL.)
TO FLY 1000 STAT. AIRMILES AT 20,000 FT. ALTITUDE
MAINTAIN 2150 RPM AND F.T. IN MANIFOLD PRESSURE
WITH MIXTURE SET: RUN

LEGEND

ALT. : PRESSURE ALTITUDE F.T. : FULL RICH
M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH
GPH : U.S. GAL. PER HOUR A.L. : AUTO-LEAN
TAS : TRUE AIRSPEED C.L. : CRUISING LEAN
KTS. : KNOTS M.L. : MANUAL LEAN
S.L. : SEA LEVEL F.T. : FULL THROTTLE

DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

Figure 70—Flight Operation Instruction Chart—10 Rockets

AN 01-60JE-1

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 6 ROCKETS AND 2 - 500-LB. BOMBS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
ENGINE(S): V-1650-3										CHART WEIGHT LIMITS: 11,600 TO 11,000 POUNDS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
LIMITS		M.P.		BLOWER MIXTURE		TIME		CYL.		TOTAL		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES	

SPECIAL NOTES

(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.)
PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.

HIGH BLOWER ABOVE HEAVY LINE

EXAMPLE

AT 11,500 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF 49 GAL.)
TO FLY 850 STAT. AIRMILES AT 20,000 FT. ALTITUDE
MAINTAIN 2150 RPM AND F.T. IN MANIFOLD PRESSURE
WITH MIXTURE SET: RUN

LEGEND

ALT. : PRESSURE ALTITUDE F.R. : FULL RICH
M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH
GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN
TAS : TRUE AIRSPEED C.L. : CRUISING LEAN
KTS. : KNOTS M.L. : MANUAL LEAN
S.L. : SEA LEVEL F.T. : FULL THROTTLE

DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA

For use with V-1650-3 engine only regardless of airplane model.

Figure 71 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—6 Rockets and Two 500-pound Bombs

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K				FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 6 ROCKETS AND 2 - 500-LB. BOMBS																					
ENGINE(S): V-1650-3				CHART WEIGHT LIMITS: 11,000 TO 10,000 POUNDS																															
LIMITS				BLOWER POSITION				MIXTURE				TIME				TOTAL				C.V.L.				TEMP.				G.P.H.							
WAR				LOW				HIGH				5				15				168				167				168							
EMERG.				LOW				HIGH				15				168				167				168											
MILITARY POWER				LOW				HIGH				15				168				167				168											
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40				20			
1400				370				320				120				100				80				60				40							

ENGINE(S):			AIRCRAFT MODEL(S) P-51D AND P-51K			FLIGHT OPERATION INSTRUCTION CHART			EXTERNAL LOAD ITEMS 6 ROCKETS PLUS 2 - 1000-LB. BOMBS										
ENGINE(S):			V-1050-3			CHART WEIGHT LIMITS: 12,000 TO 12,000 POUNDS													
LIMITS	RPM.	M.P.H.	BLOWER MIXTURE		CYL. TEMP.	TOTAL G.P.H.	FUEL		COLUMN I		COLUMN II								
			IN.	OUT.			RANGE IN AIRMILES	U.S.	RANGE IN AIRMILES	U.S.									
WAR ENRG.	3000	67	LOW	HIGH	5	187	STATUTE	NAUTICAL	RANGE IN AIRMILES	U.S.	COLUMN III								
MILITARY POWER	3000	61	LOW	HIGH	15	167	STATUTE	NAUTICAL	RANGE IN AIRMILES	U.S.	COLUMN IV								
RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES			RANGE IN AIRMILES										
STATUTE			STATUTE			STATUTE			STATUTE										
710			830			710			1090										
630			740			640			880										
580			680			590			900										
530			620			530			820										
470			560			480			740										
420			500			430			660										
370			440			370			580										
320			390			320			500										
270			340			270			420										
220			290			220			340										
170			240			170			260										
120			190			120			180										
70			140			70			100										
20			90			20			50										
0			40			0			0										
0			0			0			0										
0			0			0			0										
0			0			0													

Figure 72 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—6 Rockets and Two 1000-pound Bombs

For use with V-1650-3 engine only regardless of airplane model.

A-1-28

AFMFC-528

AIRCRAFT MODEL(S)
P-51D AND P-51K

ENGINE(S): V-1650-3

FLIGHT OPERATION INSTRUCTION CHART

CHART WEIGHT LIMITS: 12,000 TO 11,000 POUNDS

EXTERNAL LOAD ITEMS
6 ROCKETS AND 2 - 1000-LB. BOMBS

LIMITS

RPM.

M.P. IN. HG.

MIXTURE POSITION

TIME LIMIT

CYL. C.P.M.

TOTAL FUEL (GAL.)

WAR EMERG.

3000

67

LOW

RUN

5

187

MILITARY POWER

3000

61

LOW

RUN

15

167

HIGH

153

NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS 11, 111, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER MI. (G.P.M.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING AROUND (NO WIND).⁽²⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.M.): MULTIPLY U.S. GAL. (OR G.P.M.) BY 1.2.

COLUMN I

COLUMN II

COLUMN III

COLUMN IV

COLUMN V

RANGE IN AIRMILES

RANGE IN AIRMILES

RANGE IN AIRMILES

RANGE IN AIRMILES

RANGE IN AIRMILES

STATUTE

STATUTE

NAUTICAL

STATUTE

STATUTE

490

420

184

650

760

420

370

160

570

680

320

260

120

430

510

210

140

80

280

340

160

110

60

210

250

110

90

40

140

170

50

20

20

70

80

MAXIMUM CONTINUOUS

MAXIMUM CONTINUOUS

MAXIMUM CONTINUOUS

MAXIMUM CONTINUOUS

MAXIMUM CONTINUOUS

M.P. INCHES

M.P. INCHES

M.P. INCHES

M.P. INCHES

M.P. INCHES

46

46

46

46

46

2700

2700

2700

2700

2700

2550

2550

2550

2550

2550

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2500

2

For use with V-1650-3 engine only regardless of airplane model.

Figure 72 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart—6 Rockets and Two 1000-pound Bombs

AN 01-60JE-1

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K		FLIGHT OPERATION INSTRUCTION CHART				EXTERNAL LOAD ITEMS 6 ROCKETS AND 2 - 75-GALLON COMBAT TANKS			
ENGINE(S): V-1650-3		CHART WEIGHT LIMITS: 11,600 TO 10,800 POUNDS							
LIMITS	RPM	M.P. IN-HG.		CYL. POSITION	MIXTURE	TIME	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE REAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.	
		LOW	HIGH						
WAR EMERG.	3000	67	100	5	RUN	187	168	NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND) GALLONS PER HOUR (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALOFT (NO WIND) ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL OR G.P.H.: MULTIPLY U.S. GAL (OR G.P.H.) BY 10 THEN DIVIDE BY 12.	
MILITARY - POWER	3000	61	100	15	RUN	187	153		
COLUMN I		COLUMN II		COLUMN III		COLUMN IV		COLUMN V	
RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES	
STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL
1140	990	1320	1150	1600	1390	1850	1600	1940	1690
1080	950	1280	1100	1530	1330	1770	1530	1880	1620
1030	900	1200	1040	1450	1260	1690	1460	1770	1540
980	850	1140	990	1380	1200	1600	1380	1680	1460
920	810	1080	930	1310	1140	1510	1310	1590	1380
870	760	1020	880	1230	1070	1430	1230	1500	1300
820	710	950	830	1160	1010	1340	1160	1410	1230
760	670	890	770	1080	940	1260	1080	1320	1150
710	620	830	720	1010	880	1170	1010	1230	1070
MAXIMUM CONTINUOUS		PRESS		PRESS		PRESS		PRESS	
M.P. INCHES	MIX-TURE	ALT. FEET	T.A.S. KTS.	M.P. INCHES	MIX-TURE	ALT. FEET	T.A.S. KTS.	M.P. INCHES	MIX-TURE
2700	46	RUN	100	345	300	40000		40000	
2700	46	RUN	119	345	300	35000		35000	
2700	46	RUN	115	325	280	30000		30000	
2700	46	RUN	110	305	265	25000		25000	
2700	46	RUN	106	290	250	20000		20000	
2700	46	RUN	101	275	240	15000		15000	
2700	46	RUN	96	260	225	10000		10000	
2700	46	RUN	94	245	210	5000		5000	
2700	46	RUN	90	235	200	2500		2500	
2700	46	RUN	85	215	175	1000		1000	
2700	46	RUN	80	195	155	500		500	
2700	46	RUN	75	175	135	250		250	
2700	46	RUN	70	155	115	100		100	
2700	46	RUN	65	135	95	50		50	
2700	46	RUN	60	115	75	25		25	
2700	46	RUN	55	95	55	10		10	
2700	46	RUN	50	75	35	5		5	
2700	46	RUN	45	55	15	1		1	
2700	46	RUN	40	35	5	0.5		0.5	
2700	46	RUN	35	15	1	0.1		0.1	
2700	46	RUN	30	5	0.1	0.05		0.05	
2700	46	RUN	25	0.5	0.05	0.01		0.01	
2700	46	RUN	20	0.1	0.01	0.005		0.005	
2700	46	RUN	15	0.05	0.005	0.001		0.001	
2700	46	RUN	10	0.01	0.001	0.0005		0.0005	
2700	46	RUN	5	0.005	0.0005	0.0001		0.0001	
2700	46	RUN	0	0.001	0.0001	0.00005		0.00005	

For use with V-1650-3 engine only regardless of airplane model.

Figure 73 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—6 Rockets and Two 75-gallon Tanks

For use with V-1650-3 engine only regardless of airplane model.

[illegible]

For use with V-1650-3 engine only regardless of airplane model.

DATA AS OF 5-8-45 BASED ON. FLIGHT TEST DATA

Figure 73 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart—6 Rockets and Two 75-gallon Tanks

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 6 ROCKETS AND 2 - 110-GALLON COMBAT TANKS									
ENGINE(S): V-1650-3										CHART WEIGHT LIMITS: 11,000 TO 9500 POUNDS																			
LIMITS		RPM.		M.P.		BLOWER IN. HG.		MIXTURE POSITION		TIME CYCL. LIMIT		TOTAL G.P.H.		ALT. (SEE FIG. 1)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE REARST DESIRED CRUISING ALTITUDE (ALT., READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.													
WAR	MILITARY	3000	67	LOW	HIGH	5	187	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15	167	1335	1335	1335	1335	1335	1335	1335	1335														
WAR	MILITARY	3000	61	LOW	HIGH	15																							

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

Figure 74 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart—6 Rockets and Two 110-gallon Tanks

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

Figure 75 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—One 110-gallon Tank and One 1000-pound Bomb

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 1 - 110-GALLON COMBAT TANK AND 1 - 1000-LB. BOMB																																																																																																			
ENGINE(S): V-1650-3										CHART WEIGHT LIMITS: 11,000 TO 9800 POUNDS																																																																																																													
LIMITS		RPM		M.P.		MIXTURE		TIME		CYL.		TOTAL		G.P.H.		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE REARREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.																																																																																																							
WAR		3000		67		LOW		5		MIN.		187		188																																																																																																									
EMERG.						HIGH																																																																																																																	
MILITARY		3000		61		LOW		15		MIN.		187		188																																																																																																									
POWER						HIGH																																																																																																																	
COLUMN I										COLUMN II										COLUMN III										COLUMN IV										COLUMN V																																																																															
RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES																																																																															
STATUTE										STATUTE										STATUTE										STATUTE										STATUTE																																																																															
NAUTICAL										NAUTICAL										NAUTICAL										NAUTICAL										NAUTICAL																																																																															
770										940										820										1130										1080										930										269										1140										1390										1210																													
690										840										730										1010										880										760										240										1020										1240										1080																													
630										770										670										920										800										680										220										980										990										990																													
510										700										550										760										660										590										200										850										900										900																													
460										560										490										670										580										780										160										680										720										720																													
400										430										590										510										690										590										130										720										630										630																													
340										420										360										500										440										580										120										620										540										540																													
290										350										320										400										340										460										100										520										450										450																													
230										280										240										300										260										380										80										410										360										360																													
170										210										180										250										220										290										60										270										270										270																													
110										140										120										170										150										200										30										310										180										180																													
MAXIMUM CONTINUOUS										(3.5 STAT. (3.0 NAUT.) MI./GAL.)										(4.2 STAT. (3.6 NAUT.) MI./GAL.)										(4.9 STAT. (4.2 NAUT.) MI./GAL.)										PRESS																																																																															
M.P. MIX- APPROX.										M.P. MIX- APPROX.										M.P. MIX- APPROX.										M.P. MIX- APPROX.										ALT. APPROX.																																																																															
R.P.M. TOT. T.A.S.										R.P.M. TOT. T.A.S.										R.P.M. TOT. T.A.S.										R.P.M. TOT. T.A.S.										ALT. APPROX.																																																																															
INCHES TURE										INCHES TURE										INCHES TURE										INCHES TURE										FEET																																																																															
40000										40000										40000										40000										40000										40000										40000										40000										40000																																							
35000										35000										35000										35000										35000										35000										35000										35000										35000										35000																													
30000										30000										30000										30000										30000										30000										30000										30000										30000										30000										30000																			
25000										25000										25000										25000										25000										25000										25000										25000										25000										25000										25000																			
20000										20000										20000										20000										20000										20000										20000										20000										20000										20000										20000										20000									
15000										15000										15000										15000										15000										15000										15000										15000										15000										15000										15000										15000									
10000										10000										10000										10000										10000										10000										10000										10000										10000										10000										10000										10000									
5000										5000										5000										5000										5000										5000										5000										5000										5000										5000										5000										5000									
S. L.										S. L.										S. L.										S. L.										S. L.										S. L.										S. L.										S. L.										S. L.										S. L.										S. L.										S. L.									
33										33										33										33										33										33										33										33										33										33										33										33									
1600										1600										1600										1600										1600										1600										1600										1600										1600										1600										1600										1600									
10000										10000										10000										10000										10000										10000										10000										10000										10000										10000										10000										10000									
5000										5000										5000										5000										5000										5000										5000										5000										5000										5000										5000										5000									
34										34										34										34										34										34										34										34										34										34										34										34									
1600										1600										1600										1600										1600										1600										1600										1600										1600										1600										1600										1600									
45										45										45										45										45										45										45										45										45										45										45										45									
230										230										230										230										230										230										230										230										230										230										230										230									
200										200										200										200										200										200										200										200										200										200										200										200									
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215										215																			
185										185										185										185										185										185										185										185										185										185										185										185									
165										165										165										165										165										165										165										165										165										165										165										165									
185										185										185										185										185										185										185										185										185										185										185										185									
215										215										215										215										215										215										215										215										215										215																													

Figure 51—Take-off, Climb, and Landing Chart

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

AN 01-60E-1

Appendix I

Aircraft Model(S)
P-51D AND K

Engine Model(S)
V-1650-7

TAKE-OFF, CLIMB & LANDING CHART

TAKE-OFF DISTANCE FEET

GROSS WEIGHT LB.	HEAD WIND		HARD SURFACE RUNWAY								SOD-TURF RUNWAY								SOFT SURFACE RUNWAY							
			AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET							
	M.P.H.	KTS.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.						
11,000	0	0	1800	2700	2000	3000	2300	3300	2000	2800	2100	3100	2400	3400	2300	3200	2500	3400	2800	3900						
	17	15	1400	2100	1500	2300	1800	2600	1500	2200	1600	2400	1900	2700	1700	2500	1900	2700	2200	3100						
	34	30	1000	1600	1100	1800	1300	2100	1100	1700	1200	1900	1400	2100	1200	1900	1400	2100	1600	2400						
	51	45	700	1200	800	1300	900	1500	700	1200	800	1400	1000	1600	800	1300	1000	1500	1200	1700						
10,000	0	0	1600	2400	1800	2500	2000	2800	1700	2400	1800	2600	2100	3000	1900	2700	2100	2900	2400	3200						
	17	15	1200	1800	1300	2000	1500	2300	1300	1900	1400	2100	1600	2400	1400	2100	1600	2300	1800	2500						
	34	30	900	1400	1000	1500	1100	1800	900	1400	1000	1600	1200	1800	1000	1600	1200	1700	1300	2000						
	51	45	600	1000	700	1100	800	1300	600	1000	700	1200	800	1300	700	1100	800	1200	900	1500						
9000	0	0	1400	2000	1500	2200	1700	2500	1400	2100	1600	2300	1800	2500	1600	2300	1800	2500	2000	2800						
	17	15	1000	1600	1200	1700	1300	2000	1100	1600	1200	1800	1400	2000	1200	1800	1300	1900	1500	2200						
	34	30	700	1200	800	1300	1000	1500	800	1200	900	1400	1000	1500	900	1300	1000	1400	1100	1700						
	51	45	500	800	600	1000	700	1100	500	900	600	1000	700	1100	600	900	700	1000	800	1200						

NOTE: INCREASE CHART DISTANCES AS FOLLOWS: 75°F + 10%; 100°F + 20%; 125°F + 30%; 150°F + 40%

DATA AS OF 8-20-44

BASED ON: FLIGHT TESTS

OPTIMUM TAKE-OFF WITH 3000 RPM, 61 IN.HC. & 20 DEG.FLAP IS BOX OF CHART VALUES

CLIMB DATA

GROSS WEIGHT LB.	AT SEA LEVEL		AT 5000 FEET		AT 10,000 FEET		AT 15,000 FEET		AT 25,000 FEET		AT 35,000 FEET																		
	BEST I.A.S.	RATE OF CLIMB F.P.M.	BEST I.A.S.	RATE OF CLIMB F.P.M.	BEST I.A.S.	RATE OF CLIMB F.P.M.	BEST I.A.S.	RATE OF CLIMB F.P.M.	BEST I.A.S.	RATE OF CLIMB F.P.M.	BEST I.A.S.	RATE OF CLIMB F.P.M.																	
11,000	175	150	1450	15	175	150	1500	6.8	26	170	150	1450	10.5	31	165	145	1100	19	44	145	130	150	39	76					
10,000	175	150	1750	15	175	150	1750	2.8	20	175	150	1800	5.6	24	170	150	1800	8.5	29	165	145	1400	15	40	145	130	150	27	58
9000	175	150	2050	15	175	150	2100	2.4	19	175	150	2150	4.8	23	170	150	2150	7.5	27	165	145	1800	13	36	145	130	750	20	48

POWER PLANT SETTINGS: (DETAILS ON FIG. 29, SECTION III): MAX. CONTINUOUS POWER

DATA AS OF 2-26-47 BASED ON:

FUEL USED (U.S. GAL.) INCLUDES WARM-UP & TAKE-OFF ALLOWANCE

LANDING DISTANCE FEET

GROSS WEIGHT LB.	BEST IAS APPROACH				HARD DRY SURFACE				FIRM DRY SOD				WET OR SLIPPERY									
	POWER OFF		POWER ON		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET	
	MPH	KTS	MPH	KTS	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.
10,000	130	115	130	115	1300	2500	1600	2600	1700	2800	1500	2600	1700	2800	1900	3000	3500	4800	3900	5100	4400	5500
9000	130	115	130	115	1200	2300	1400	2400	1500	2600	1400	2400	1600	2600	1700	2800	3200	4300	3500	4600	3900	5000
8000	130	115	130	115	1100	2100	1200	2200	1400	2400	1300	2200	1400	2400	1500	2600	2800	3800	3100	4100	3400	4500

NOTE: TO DETERMINE FUEL CONSUMPTION IN BRITISH IMPERIAL GALLONS, MULTIPLY BY 10, THEN DIVIDE BY 12

DATA AS OF 8-20-44

BASED ON: FLIGHT TESTS

OPTIMUM LANDING IS BOX OF CHART VALUES

REMARKS:

LEGEND

I.A.S. : INDICATED AIRSPEED
M.P.H. : MILES PER HOUR
KTS. : KNOTS
F.P.M. : FEET PER MINUTE

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

AFM-32B 4-1-44		AIRCRAFT MODEL(S) P-51D & K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS WING RACKS ONLY									
ENGINE(S): V-1650-7										CHART WEIGHT LIMITS: 10,200 TO 8,000 POUNDS																					
LIMITS	RPM	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	COOL'T TEMP.	TOTAL G.P.H.	FOR DETAILS SEE (OPER. INSTR. CHART) (FIG. 51, SEC. 11)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.											
WAR EMERG.	3000	67	LOW HIGH	RUN	5 min.	135°	210																								
MILITARY POWER	3000	61	LOW HIGH	RUN	15 min.	135°	180																								
COLUMN I		FUEL		COLUMN II		COLUMN III		COLUMN IV		FUEL		COLUMN V																			
RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES																			
STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL																	
		269		SUBTRACT		FUEL ALLOWANCES		NOT AVAILABLE FOR		CRUISING				269																	
950		825		260		1065		920		1195		1300		1130																	
880		765		240		985		855		1105		1200		1040																	
805		700		220		900		780		1010		875		955																	
730		635		200		820		710		920		800		870																	
640		555		180		740		645		830		720		780																	
585		510		160		655		570		735		640		695																	
515		445		140		575		500		645		560		610																	
440		380		120		490		425		550		475		520																	
365		315		100		410		355		460		400		435																	
295		255		80		330		285		370		400		350																	
220		190		60		245		210		275		300		260																	
145		125		40		165		145		185		200		175																	
75		65		20		80		70		90		100		87																	
MAXIMUM CONTINUOUS		PRESS		(4.10 STAT. (3.56 NAUT.) MI./GAL.)		(4.80 STAT. (4.00 NAUT.) MI./GAL.)		(5.00 STAT. (4.34 NAUT.) MI./GAL.)		PRESS		MAXIMUM AIR RANGE																			
R.P.M.		M.P.		MIX-TURE		MIX-TURE		MIX-TURE		M.P.		MIX-TURE																			
INCHES		T.O.T.		T.A.S.		T.O.T.		T.A.S.		T.O.T.		T.A.S.																			
G.P.H.		G.P.H.		M.P.H.		G.P.H.		M.P.H.		G.P.H.		M.P.H.																			
KTS.		KTS.		KTS.		KTS.		KTS.		KTS.		KTS.																			
SEE COLUMN I		40000		2700		F.T.		RUN		97		424																			
SEE COLUMN I		35000		2650		F.T.		RUN		90		417																			
SEE COLUMN I		30000		2450		F.T.		RUN		76		351																			
2700		46		RUN		103		384		334		15000		2500																	
2700		46		RUN		98		361		314		10000		2500																	
2700		46		RUN		91		339		284		5000		2500																	
2700		46		RUN		86		315		274		S. L.		2500																	

For use with V-1650-7 engine only regardless of airplane model.

Figure 52—Flight Operation Instruction Chart—Wing Racks

For use with V-1650-7 engine only regardless of airplane model.

Figure 53 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

AN 01-601E-1

Appendix I

AIRCRAFT MODEL(S) P-51D & K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS TWO 500 LB. BOMBS OR TWO 75 GAL. WING TANKS																							
ENGINE(S): V-1650-7										CHART WEIGHT LIMITS: 11,200 TO 9,800 POUNDS																																	
LIMITS	RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	COOL'T TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. 29 SECT. III)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUF NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.																							
WAR EMERG.	3000	67	LOW	RUN	5	135°	210																																				
MILITARY POWER	3000	61	LOW	RUN	15	135°	180																																				
COLUMN I				FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V																							
RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES																							
STATUTE				NAUTICAL		STATUTE				NAUTICAL				STATUTE				NAUTICAL				STATUTE		NAUTICAL																			
1390				1205		1485				1290				1610				419		1995				1735																			
1320				1145		1430				1600				1535				390		1895				1650																			
1250				1085		1350				1515				1670				370		1795				1560																			
1185				1030		1280				1435				1580				350		1700				1480																			
1120				975		1200				1350				1490				330		1600				1390																			
1050				910		1130				1265				1400				310		1500				1305																			
985				855		1050				1180				1305				290		1400				1220																			
915				795		980				1100				1215				270		1300				1130																			
845				735		900				1015				1115				250		1200				1045																			
780				675		830				930				1030				230		1110				965																			
710				615		755				850				945				210		1010				880																			
645				560		685				770				855				190		915				795																			
575				500		610				690				765				170		820				715																			
510				445		540				605				675				150		720				625																			
MAXIMUM CONTINUOUS				PRESS		(2.60 STAT. (3.13 NAUT.) MI./GAL.)				(4.05 STAT. (3.52 NAUT.) MI./GAL.)				(4.40 STAT. (3.90 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE																							
R.P.M.				M.P.		MIX-TURE		APPROX.		R.P.M.				M.P.		MIX-TURE		APPROX.		R.P.M.				M.P.		MIX-TURE		APPROX.															
TOT.				T.A.S.		TOT.		T.A.S.		TOT.				T.A.S.		TOT.				T.A.S.		TOT.				T.A.S.		TOT.		T.A.S.													
GPH.				MPH.		KTS.		GPH.				MPH.		KTS.		GPH.				MPH.		GPH.				MPH.		KTS.		GPH.				MPH.		KTS.							
SEE COLUMN III										2700				F.T.		RUN		94		383		333		2500				F.T.		RUN		79		356		310							
SEE COLUMN II										2500				44		RUN		90		367		319		2300				F.T.		RUN		76		341		297							
2700				46		RUN		103		356		310		15000		2600		44.5		RUN		97		349		303		2400				F.T.		RUN		80		327		284			
2700				46		RUN		98		377		328		2550				44		RUN		85		344		299		2150				38		RUN		70		319		277			
2700				46		RUN		91		312		271		2300				41		RUN		75		304		264		2000				38		RUN		63		281		244			
2700				46		RUN		86		292		254		2250				40.5		RUN		65		262		228		1900				37		RUN		53		239		208			
2700				46		RUN		98		334		290		10000				2600		44.5		RUN		91		326		284		2300				41		RUN		75		304		264	
2700				46		RUN		91		312		271		5000				2600		44		RUN		84		304		264		2300				41		RUN		70		283		246	
2700				46		RUN		86		292		254		S.L.				2550		44		RUN		78		282		245		2250				40.5		RUN		65		262		228	

SPECIAL NOTES

(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 51)
PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.

(2) MAX. FUEL CAPACITY WITH 2-75 GAL. WING, STD. WING TANKS
& FUSELAGE TANKS,
HIGH BLOWER ABOVE HEAVY LINE

EXAMPLE

AT 10000 LB. GROSS WEIGHT WITH 210 GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF 20 GAL.)
TO FLY 850 STAT. AIRMILES AT 5000 FT. ALTITUDE
MAINTAIN 2300 RPM AND 41 IN. MANIFOLD PRESSURE
WITH MIXTURE SET: RUN. WHEN WEIGHT REACHES
9,800 LBS. USE POWER SETTINGS SHEET 2, COLUMN III.

LEGEND

ALT. : PRESSURE ALTITUDE F.R. : FULL RICH
M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH
GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN
TAS : TRUE AIRSPEED C.L. : CRUISING LEAN
KTS. : KNOTS M.L. : MANUAL LEAN
S.L. : SEA LEVEL F.T. : FULL THROTTLE

REVISED 1-21-47
DATA AS OF 9-10-44 BASED ON: FLIGHT TEST

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

AFM-528
4-1-44

AIRCRAFT MODEL(S)
P-51D & K

FLIGHT OPERATION INSTRUCTION CHART

EXTERNAL LOAD ITEMS
TWO 500 LB. BOMBS
OR TWO 75 GAL. WING TANKS

ENGINE(S): V-1650-7

CHART WEIGHT LIMITS: 9,800 TO 8,100 POUNDS

LIMITS	RPM	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	COOL. TEMP.	TOTAL G.P.W.	FOR DETAILS SEE (POWER PLANT CHART) (P. 12, 22, 23, 24)
WAR EMERG.	3000	67	LOW	RUN	5	135°	210	
	"	"	HIGH	"	min.	"	"	
MILITARY POWER	3000	61	LOW	RUN	15	135°	180	
	"	"	HIGH	"	min.	"	"	

INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN
EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING
MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE
EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES
TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST
DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE
(M.P.) AND MIXTURE SETTING REQUIRED.

NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS
II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE
IN SPEED. AIR MILES PER GALLON (M./GAL.) (NO WIND), GALLONS PER HR.
(G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR
REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE
(NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.N.): MULTIPLY
U.S. GAL. (OR G.P.U.) BY 10 THEN DIVIDE BY 12.

COLUMN I		FUEL	COLUMN II		COLUMN III		COLUMN IV		FUEL	COLUMN V	
RANGE IN AIRMILES		U.S.	RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.	RANGE IN AIRMILES	
STATUTE	NAUTICAL	GAL.	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	GAL.	STATUTE	NAUTICAL
			SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁰¹								
950	825	280	1050	915	1170	1020	1275	1110	280	1380	1200
880	765	260	975	845	1090	945	1185	1030	260	1280	1110
815	710	240	900	785	1005	875	1090	945	240	1185	1030
745	645	220	825	715	920	800	1000	870	220	1085	940
680	590	200	750	650	835	725	910	790	200	990	860
610	530	180	675	585	755	655	820	715	180	890	775
545	475	160	600	520	670	580	730	635	160	790	685
475	415	140	525	455	585	510	635	550	140	690	600
405	350	120	450	390	500	435	545	475	120	590	515
340	295	100	375	325	420	365	455	395	100	495	430
270	235	80	300	260	335	290	365	315	80	395	345
205	180	60	225	195	250	220	275	240	60	295	255
135	115	40	150	130	165	145	180	155	40	195	170

MAXIMUM CONTINUOUS							PRESS	(4.75 STAT. (3.25 NAUT.) M1./GAL.)							(4.18 STAT. (3.64 NAUT.) M1./GAL.)							(4.55 STAT. (3.96 NAUT.) M1./GAL.)							PRESS	MAXIMUM AIR RANGE						
R.P.M.	M.P. INCHES	MIX- TURE	APPROX.			ALT. FEET		R.P.M.	M.P. INCHES	MIX- TURE	APPROX.				R.P.M.	M.P. INCHES	MIX- TURE	APPROX.				R.P.M.	M.P. INCHES	MIX- TURE	APPROX.			ALT. FEET	R.P.M.	M.P. INCHES	MIX- TURE	APPROX.				
			TOT. GPH.	T.A.S. MPH.	KTS.						TOT. GPH.	T.A.S. MPH.	KTS.					TOT. GPH.	T.A.S. MPH.	KTS.					TOT. GPH.	T.A.S. MPH.	KTS.				TOT. GPH.	T.A.S. MPH.	KTS.			
	SEE COLUMN IV					40000																				40000										
	SEE COLUMN III					35000																				35000										
						30000																				30000										
	SEE COLUMN II					25000		2700	46	RUN	98	377	328	2450	42.5	RUN	87	362	314	2300	F.T.	RUN	75	342	297	25000	2100	F.T.	RUN	62	311	270				
	SEE COLUMN I					20000		2700	46	RUN	93	355	308	2400	42.5	RUN	80	337	293	2150	38	RUN	70	318	276	20000	2150	F.T.	RUN	59	294	258				
2700	46	RUN	103	356	309	15000		2550	43	RUN	91	341	296	2350	F.T.	RUN	79	322	280	2150	F.T.	RUN	66	300	261	15000	1900	F.T.	RUN	55	272	236				
2700	46	RUN	98	333	289	10000		2500	43	RUN	83	316	275	2200	40	RUN	71	298	259	1950	37	RUN	61	278	242	10000	1600	38	RUN	50	251	218				
2700	46	RUN	91	311	270	5000		2450	42.5	RUN	77	293	255	2200	40	RUN	66	276	240	1900	37	RUN	55	256	222	5000	1600	32.5	RUN	46	229	199				
2700	46	RUN	86	291	253	S. L.		2450	42.5	RUN	72	273	237	2150	39.5	RUN	61	256	222	1850	37	RUN	51	236	205	S. L.	1600	29.5	RUN	41	200	174				

SPECIAL NOTES

(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 51)
PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.
HIGH BLOWER ABOVE HEAVY LINE

EXAMPLE

AT 9,400 LB. GROSS WEIGHT WITH 100 GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF 20 GAL.)
TO FLY 420 STAT. AIRMILES AT 5000 FT. ALTITUDE
MAINTAIN 2200 RPM AND NO IN. MANIFOLD PRESSURE
WITH MIXTURE SET: RUN

LEGEND

ALT.: PRESSURE ALTITUDE
M.P.: MANIFOLD PRESSURE
GPH.: U.S. GAL. PER HOUR
TAS.: TRUE AIRSPEED
KTS.: KNOTS
S.L.: SEA LEVEL
F.R.: FULL RICH
A.R.: AUTO-RICH
A.L.: AUTO-LEAN
C.L.: CRUISING LEAN
M.L.: MANUAL LEAN
F.T.: FULL THROTTLE

REVISED 1-21-47

DATA AS OF 9-10-44

BASED ON: FLIGHT TEST

For use with V-1650-7 engine only regardless of airplane model.

A17C-52B 4-1-44	AIRCRAFT MODEL(S) P-51D & K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS TWO 500 LB. BOMBS OR TWO 75 GAL. WING TANKS																															
	ENGINE(S): V-1650-7										CHART WEIGHT LIMITS: 9,800 TO 8,100 POUNDS																																									
LIMITS		RPM	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	COOL. TEMP.	TOTAL G.P.H.	FOR DETAILS SEE (POWER PLANT CHART) (P. 17-22)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (M./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.N.): MULTIPLY U.S. GAL. (OR G.P.U.) BY 10 THEN DIVIDE BY 12.																															
WAR EMERG.		3000	67	LOW	RUN	5	135°	210																																												
MILITARY POWER		3000	61	LOW	RUN	15	135°	180																																												
				HIGH		min.																																														
COLUMN I										FUEL	COLUMN II										COLUMN III										COLUMN IV										FUEL	COLUMN V										
RANGE IN AIRMILES										U.S.	RANGE IN AIRMILES										RANGE IN AIRMILES										RANGE IN AIRMILES										U.S.	RANGE IN AIRMILES										
STATUTE										GAL.	STATUTE										STATUTE										STATUTE										GAL.	STATUTE										
NAUTICAL											NAUTICAL										NAUTICAL										NAUTICAL											NAUTICAL										
950										280	1050										1020										1275										280	1380										
880										260	975										945										1185										260	1280										
815										240	900										875										945										240	1185										
745										220	825										800										870										220	1085										
680										200	750										725										790										200	990										
610										180	675										655										715										180	890										
545										160	600										580										635										160	790										
475										140	525										510										550										140	690										
405										120	450										435										475										120	580										
340										100	375										365										395										100	495										
270										80	300										290										315										80	395										
205										60	225										220										240										60	295										
135										40	150										145										155										40	195										
MAXIMUM CONTINUOUS										PRESS	(3.75 STAT. (3.25 NAUT.) MI./GAL.)										(4.18 STAT. (3.64 NAUT.) MI./GAL.)										(5.55 STAT. (3.96 NAUT.) MI./GAL.)										PRESS	MAXIMUM AIR RANGE										
R.P.M.										ALT.	R.P.M.										R.P.M.										R.P.M.										ALT.	R.P.M.										
M.P.										FEET	M.P.										M.P.										M.P.										FEET	M.P.										
MIX-TURE											MIX-TURE										MIX-TURE										MIX-TURE											MIX-TURE										
APPROX.											APPROX.										APPROX.										APPROX.											APPROX.										
TOT.											TOT.										TOT.										TOT.											TOT.										
G.P.H.											G.P.H.										G.P.H.										G.P.H.											G.P.H.										
M.P.H.											M.P.H.										M.P.H.										M.P.H.											M.P.H.										
KTS.											KTS.										KTS.										KTS.											KTS.										
SEE COLUMN IV										40000											2700										F.T.										40000	2450										
SEE COLUMN III										35000											2500										F.T.										35000	2300										
SEE COLUMN II										30000											2650										F.T.										30000	2100										
SEE COLUMN I										25000	2700										46										F.T.										25000	2100										
20000										20000	2700										46										F.T.										20000	2150										
15000										15000	2550										43										F.T.										15000	1900										
2700										46	RUN										98	377										328										2700	46									
2700										46	RUN										93	355										308										2700	46									
2700										46	RUN										91	341										296										2700	46									
2700										46	RUN										83	316										275										2700	46									
2700										46	RUN										77	293										255										2700	46									
2700										46	RUN										72	273										237										2700	46									
SPECIAL NOTES										EXAMPLE										LEGEND																																
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 51) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED. HIGH BLOWER ABOVE HEAVY LINE										AT 9,400 LB. GROSS WEIGHT WITH 100 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 20 GAL.) TO FLY 420 STAT. AIRMILES AT 5000 FT. ALTITUDE MAINTAIN 2200 RPM AND NO IN. MANIFOLD PRESSURE WITH MIXTURE SET: RUN										ALT.: PRESSURE ALTITUDE M.P.: MANIFOLD PRESSURE GPH.: U.S. GAL. PER HOUR TAS.: TRUE AIRSPEED KTS.: KNOTS S.L.: SEA LEVEL F.R.: FULL RICH A.R.: AUTO-RICH A.L.: AUTO-LEAN C.L.: CRUISING LEAN M.L.: MANUAL LEAN F.T.: FULL THROTTLE																																
REVISED 1-21-47 DATA AS OF 9-10-44										BASED ON: FLIGHT TEST																																										

Figure 54 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart

For use with V-1650-7 engine only regardless of airplane model.

AFM-32B
6-1-44

AIRCRAFT MODEL(S)
P-51D & K

FLIGHT OPERATION INSTRUCTION CHART

EXTERNAL LOAD ITEMS
6 BOMBERS + 2-7.5 GAL. WING TANKS
OR 6 ROCKETS + 2-110 GAL. WING TANKS
OR 6 ROCKETS + 1-110 GAL. W. TANK + 1-1000# BOMB
OR 6 ROCKETS + 2-1000# BOMBS

ENGINE(S): V-1650-7

CHART WEIGHT LIMITS: 13,000 TO 11,000 POUNDS

LIMITS	RPM.	H.P. IN H.G.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	COOL- ING TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. 29 SECT. I.II)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALVE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.		NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER MI. (G.P.M.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONG (NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.M.): MULTIPLY U.S. GAL. (OR G.P.M.) BY 10 THEN DIVIDE BY 12.	
WAR EMERG.	3000 "	67 "	LOW HIGH	RUN "	5 min.	135°C "	210 "						
MILITARY POWER	3000 "	61 "	LOW HIGH	RUN "	15 min.	135°C "	180 "						

COLUMN I				FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V																																					
RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES																																					
STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL																																			
				489 ⁽²⁾		SUBTRACT				FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽³⁾								489 ⁽²⁾																																							
1490				1295		480		1590		1380		1740		1510		1860		1620		480		1940		1685																																	
1395				1210		450		1485		1290		1625		1410		1730		1505		450		1810		1570																																	
1300				1130		420		1380		1200		1510		1310		1600		1390		420		1680		1460																																	
1205				1045		390		1280		1110		1390		1210		1475		1270		390		1550		1350																																	
1110				965		360		1175		1020		1275		1110		1345		1180		360		1415		1230																																	
1015				880		330		1070		930		1160		1010		1220		1060		330		1290		1120																																	
925				805		300		970		845		1055		915		1110		965		300		1170		1015																																	
830				720		270		875		760		950		825		1000		870		270		1055		915																																	
740				645		240		780		680		840		730		890		775		240		935		810																																	
645				560		210		680		590		740		645		775		675		210		820		715																																	
555				480		180		585		510		630		550		665		580		180		700		610																																	
460				400		150		485		420		525		455		555		480		150		585		510																																	
370				320		120		390		340		420		365		445		385		120		470		410																																	
MAXIMUM CONTINUOUS				PRESS		(3.24 STAT. (2.82 NAUT.) MI./GAL.)				(3.51 STAT. (3.05 NAUT.) MI./GAL.)				(3.70 STAT. (3.22 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE																																					
R.P.M.		M.P. INCHES		MIX-TURE		APPROX.		ALT. FEET		R.P.M.		M.P. INCHES		MIX-TURE		APPROX.		ALT. FEET		R.P.M.		M.P. INCHES		MIX-TURE		APPROX.																															
				TOT. T.A.S.		GPH. MPH. KTS.								TOT. T.A.S.		GPH. MPH. KTS.								TOT. T.A.S.		GPH. MPH. KTS.																															
						40000										40000										40000																															
						35000										35000										35000																															
						30000										30000										30000																															
						25000		2700		46		RUN		98		332		288		2550		44		RUN		92		323		281		2350		F.T.		RUN		80		295		256		25000													
						20000		2700		46		RUN		93		315		273		2550		44.5		RUN		86		304		264		2350		41		RUN		77		285		248		20000													
2700				46		RUN		103		322		280		15000		2600		44.5		RUN		97		314		273		2450		F.T.		RUN		85		299		260		2350		F.T.		RUN		77		284		247		15000					
2700				46		RUN		98		302		262		10000		2600		44.5		RUN		91		295		256		2400		42		RUN		80		281		244		2250		40		RUN		72		267		232		10000					
2700				46		RUN		91		283		246		5000		2600		44.5		RUN		85		275		239		2400		42		RUN		74		261		227		2200		40		RUN		66		247		215		5000					
2700				46		RUN		86		265		230		S.L.		2600		44		RUN		78		256		222		2350		41.5		RUN		69		243		211		2200		40		RUN		62		231		201		S.L.		1900			

SPECIAL NOTES

- (1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 51)
PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.
- (2) MAX. FUEL CAPACITY WITH 2-110 GAL. WING TANKS, ST'D. WING
TANKS & FUSELAGE TANKS.
HIGH BLOWER ABOVE HEAVY LINE

EXAMPLE

AT 11,000 LB. GROSS WEIGHT WITH 330 GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF 76 GAL.)
TO FLY 1220 STAT. AIRMILES AT 10,000 FT. ALTITUDE
MAINTAIN 2250 RPM AND 40 IN. MANIFOLD PRESSURE
WITH MIXTURE SET: RUN. WHEN WEIGHT REACHES
11,000 LBS. USE POWER SETTINGS SHEET 2, COLUMN IV.

LEGEND

- ALT. : PRESSURE ALTITUDE
- M.P. : MANIFOLD PRESSURE
- GPH. : U.S. GAL. PER HOUR
- TAS : TRUE AIRSPEED
- KTS. : KNOTS
- S.L. : SEA LEVEL
- F.R. : FULL RICH
- A.R. : AUTO-RICH
- A.L. : AUTO-LEAN
- C.L. : CRUISING LEAN
- M.L. : MANUAL LEAN
- F.T. : FULL THROTTLE

REvised 1-27-47
DATA AS OF 12-1-44

BASED ON: FLIGHT TESTS

For use with V-1650-7 engine only regardless of airplane model.

AN 01-60JE-1

Appendix

For use with V-1650-7 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D & K	ENGINE(S): V-1650-7										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 6 ROCKETS + 2-75 GAL. WING TANKS OR 6 ROCKETS + 2-110 GAL. WING TANKS OR 6 ROCKETS + 1-110 GAL. WING TANK + 1-1000 BOMB OR 6 ROCKETS + 2-1000 BOMBS									
LIMITS										INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALVE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (M./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.										
WAR EMERG.																														
MILITARY POWER																														

For use with V-1650-7 engine only regardless of airplane model.

Figure 54 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart

For use with V-1650-7 engine only regardless of airplane model.

Figure 55 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

AN 01-601E-1

Appendix I

AIRCRAFT MODEL(S) P-61D & K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS TWO 1000# BOMBS OR ONE 1000# BOMB + ONE 110 GAL. W. TANK OR TWO 110 GAL. WING TANKS (OR TEN 5" ROCKETS)																																											
ENGINE(S): V-1650-7										CHART WEIGHT LIMITS: 12,200 TO 10,300 POUNDS																																																					
LIMITS		RPM	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	COOL. TEMP.	TOTAL G.P.W.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ⁽¹⁾ MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽²⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.W.): MULTIPLY U.S. GAL. (OR G.P.W.) BY 10 THEN DIVIDE BY 12.																																												
WAR EMERG.	3000	67	LOW	RUN	5	135°	210																																																								
MILITARY POWER	3000	61	LOW	RUN	15	135°	180																																																								
COLUMN I		FUEL		COLUMN II		COLUMN III		COLUMN IV		FUEL		COLUMN V		FUEL		COLUMN V																																															
RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES																																															
STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL																																													
		489 ⁽²⁾				SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽¹⁾				489 ⁽²⁾						2250		1955																																													
1590		1380		480		1745		1515		1955		1700		2145		1865		480		2250		1955																																									
1455		1265		440		1595		1385		1785		1550		1960		1700		440		2055		1780																																									
1325		1150		400		1445		1255		1615		1405		1770		1540		400		1855		1610																																									
1190		1035		360		1295		1125		1445		1255		1580		1370		360		1660		1440																																									
1060		920		320		1145		995		1275		1110		1390		1210		320		1460		1270																																									
925		805		280		1000		870		1115		970		1220		1060		280		1280		1110																																									
795		690		240		855		745		955		830		1045		910		240		1095		950																																									
660		575		200		715		620		795		690		870		755		200		915		795																																									
530		460		160		570		495		635		550		695		605		160		730		635																																									
MAXIMUM CONTINUOUS		PRESS		(3.57 STAT. (3.10 NAUT.) MI./GAL.)		(3.98 STAT. (3.46 NAUT.) MI./GAL.)		(4.35 STAT. (3.78 NAUT.) MI./GAL.)		PRESS		MAXIMUM AIR RANGE		PRESS		MAXIMUM AIR RANGE																																															
M.P. INCHES		MIX-TURE		APPROX.		APPROX.		APPROX.		M.P. INCHES		MIX-TURE		APPROX.		APPROX.																																															
R.P.M.		TOT.		T.A.S.		TOT.		T.A.S.		R.P.M.		TOT.		T.A.S.		TOT.		T.A.S.																																													
		GPH		MPH		KTS.		GPH		MPH		KTS.		GPH		MPH		KTS.																																													
		40000		35000		30000		40000		35000		30000		40000		35000		30000																																													
SEE COLUMN I		25000		2700		46		RUN		98		370		322		2500		43.5		RUN		89		356		309		2250		F.T.		RUN		72		313		272		25000		2200		F.T.		RUN		61		280		243											
SEE COLUMN I		20000		2700		46		RUN		93		349		303		2500		43.5		RUN		84		335		291		2150		F.T.		RUN		70		304		264		20000		2000		F.T.		RUN		59		271		236											
2700		46		RUN		103		352		306		15000		2600		44		RUN		95		343		298		2400		F.T.		RUN		81		322		280		2150		F.T.		RUN		66		291		253		15000		2000		F.T.		RUN		54		235		204	
2700		46		RUN		98		327		284		10000		2550		44		RUN		89		317		276		2250		40.5		RUN		74		297		258		1950		37.5		RUN		82		272		236		10000		1800		36		RUN		56		253		220	
2700		46		RUN		91		308		268		5000		2550		44		RUN		82		298		259		2250		40.5		RUN		69		278		242		1950		37.5		RUN		58		254		221		1650		1650		34.5		RUN		49		225		195	
2700		46		RUN		86		288		250		S.L.		2550		44		RUN		78		278		242		2250		40.5		RUN		65		260		226		1950		37.5		RUN		54		235		204		S.L.		1600		34		RUN		46		210		182	

SPECIAL NOTES

(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 51) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.

(2) MAX. FUEL CAPACITY WITH 2-110 GAL. WING TANKS, STD. WING TANKS & FUSELAGE TANKS.

HIGH BLOWER ABOVE HEAVY LINE

EXAMPLE

AT 11,000 LB. GROSS WEIGHT WITH 280 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 20 GAL.) TO FLY 1220 STAT. AIRMILES AT 5000 FT. ALTITUDE MAINTAIN 1950 RPM AND 37.5 IN. MANIFOLD PRESSURE WITH MIXTURE SET: RUN. WHEN WEIGHT REACHES 10,300 LBS. USE POWER SETTING SHEET 2, COLUMN IV.

LEGEND

ALT.: PRESSURE ALTITUDE
M.P.: MANIFOLD PRESSURE
GPH: U.S. GAL. PER HOUR
TAS: TRUE AIRSPEED
KTS.: KNOTS
S.L.: SEA LEVEL

F.R.: FULL RICH
A.R.: AUTO-RICH
A.L.: AUTO-LEAN
C.L.: CRUISING LEAN
M.L.: MANUAL LEAN
F.T.: FULL THROTTLE

REVISED 1-24-47
DATA AS OF 9-10-44

BASED ON: FLIGHT TEST

For use with V-1650-7 engine only regardless of airplane model.

Figure 55 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

AN 01-601E-1

Appendix I

AIRCRAFT MODEL(S) P-61D & K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS TWO 1000# BOMBS OR ONE 1000# BOMB + ONE 110 GAL. W. TANK OR TWO 110 GAL. WING TANKS (OR TEN 5" ROCKETS)									
ENGINE(S): V-1650-7										CHART WEIGHT LIMITS: 12,200 TO 10,300 POUNDS																			
LIMITS		RPM	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	COOL. TEMP.	TOTAL G.P.W.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ⁽¹⁾ MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽²⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.W.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.										
WAR EMERG.	3000	67	LOW	RUN	5	135	210																						
MILITARY POWER	3000	61	LOW	RUN	15	135	180																						

COLUMN I		FUEL	COLUMN II		COLUMN III		COLUMN IV		FUEL	COLUMN V				
RANGE IN AIRMILES		U.S.	RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.	RANGE IN AIRMILES				
STATUTE	NAUTICAL	GAL.	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	GAL.	STATUTE	NAUTICAL			
		489 ⁽²⁾	SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽¹⁾									489		
1590	1380	480	1745	1515	1955	1700	2145	1865	480	2250	1955			
1455	1265	440	1595	1385	1785	1550	1960	1700	440	2055	1780			
1325	1150	400	1445	1255	1615	1405	1770	1540	400	1855	1610			
1190	1035	360	1295	1125	1445	1255	1580	1370	360	1660	1440			
1060	920	320	1145	995	1275	1110	1390	1210	320	1460	1270			
925	805	280	1000	870	1115	970	1220	1060	280	1280	1110			
795	690	240	855	745	955	830	1045	910	240	1095	950			
660	575	200	715	620	795	690	870	755	200	915	795			
530	460	160	570	495	635	550	695	605	160	730	635			

MAXIMUM CONTINUOUS										PRESS										MAXIMUM AIR RANGE									
APPROX.										APPROX.										APPROX.									
R.P.M.	M.P. INCHES	MIX- TURE	TOT. GPH.	T.A.S. MPH.	KTS.	ALT. FEET	R.P.M.	M.P. INCHES	MIX- TURE	TOT. GPH.	T.A.S. MPH.	KTS.	ALT. FEET	R.P.M.	M.P. INCHES	MIX- TURE	TOT. GPH.	T.A.S. MPH.	KTS.	ALT. FEET	R.P.M.	M.P. INCHES	MIX- TURE	TOT. GPH.	T.A.S. MPH.	KTS.			
						40000							40000							40000									
						35000							35000							35000									
						30000							30000							30000									
						25000	2700	46	RUN	98	370	322	2500	43.5	RUN	89	356	309	2250	F.T.	RUN	72	313	272	25000				
						20000	2700	46	RUN	93	349	303	2500	43.5	RUN	84	335	291	2150	F.T.	RUN	70	304	264	20000	2200			
						15000	2600	44	RUN	95	343	298	2400	F.T.	RUN	81	322	280	2150	F.T.	RUN	66	291	253	15000	2000			
2700	46	RUN	103	352	306	15000	2600	44	RUN	95	343	298	2400	F.T.	RUN	81	322	280	2150	F.T.	RUN	66	291	253	15000	2000			
2700	46	RUN	98	327	284	10000	2550	44	RUN	89	317	276	2250	40.5	RUN	74	297	258	1950	37.5	RUN	62	272	236	10000	1800			
2700	46	RUN	91	308	268	5000	2550	44	RUN	82	298	259	2250	40.5	RUN	69	278	242	1950	37.5	RUN	58	254	221	5000	1650			
2700	46	RUN	86	288	250	S.L.	2550	44	RUN	78	278	242	2250	40.5	RUN	65	260	226	1950	37.5	RUN	54	235	204	S.L.	1600			

SPECIAL NOTES										EXAMPLE										LEGEND									
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 51) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.										AT 11,000 LB. GROSS WEIGHT WITH 280 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 20 GAL.) TO FLY 1220 STAT. AIRMILES AT 5000 FT. ALTITUDE MAINTAIN 1950 RPM AND 37.5 IN. MANIFOLD PRESSURE WITH MIXTURE SET: RUN. WHEN WEIGHT REACHES 10,300 LBS. USE POWER SETTING SHEET 2, COLUMN IV.										ALT.: PRESSURE ALTITUDE M.P.: MANIFOLD PRESSURE GPH.: U.S. GAL. PER HOUR TAS.: TRUE AIRSPEED KTS.: KNOTS S.L.: SEA LEVEL									
(2) MAX. FUEL CAPACITY WITH 2-110 GAL. WING TANKS, STD. WING TANKS & FUSELAGE TANKS. HIGH BLOWER ABOVE HEAVY LINE																				F.R.: FULL RICH A.R.: AUTO-RICH A.L.: AUTO-LEAN C.L.: CRUISING LEAN M.L.: MANUAL LEAN F.T.: FULL THROTTLE									

REVISED 1-24-47	BASED ON: FLIGHT TEST
DATA AS OF 9-10-44	

For use with V-1650-7 engine only regardless of airplane model.

EXTERNAL LOAD ITEMS
TWO 1000# BOMBS
OR ONE 1000# BOMBS + ONE 110 GAL. M. TANK
OR TWO 110 GAL. MING TANKS
(OR TEN 5" ROCKETS)

CHART WEIGHT LIMITS: 10,300 TO 8,100 POUNDS

ENGINE(S): V-1650-7

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

EXTERNAL LOAD ITEMS
TWO 1000# BOMBS
OR ONE 1000# BOMBS + ONE 110 GAL. M. TANK
OR TWO 110 GAL. MING TANKS
(OR TEN 5" ROCKETS)

CHART WEIGHT LIMITS: 10,300 TO 8,100 POUNDS

ENGINE(S): V-1650-7

For use with V-1650-7 engine only regardless of airplane model.

For use with V-1650-7 engine only regardless of airplane model.

AIRPC-527
4-1-44

AIRCRAFT MODEL(S)
P-51D AND P-51K

TAKE-OFF, CLIMB & LANDING CHART

ENGINE MODEL(S)
V-1650-3

TAKE-OFF DISTANCE FEET

GROSS WEIGHT LB.	HEAD WIND M.P.H. KTS.	HARD SURFACE RUNWAY						SOD-TURF RUNWAY						SOFT SURFACE RUNWAY					
		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET	
		GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.	GROUND RUN	TO CLEAR 50' OBJ.
		0	17	34	51	0	17	34	51	0	17	34	51	0	17	34	51	0	17
9000	0	1350	2000	1500	2200	1700	2450	1450	2100	1600	2250	1800	2500	1600	2250	1750	2450	2000	2750
	17	1000	1550	1150	1700	1300	1950	1050	1600	1200	1800	1350	2000	1200	1750	1350	1900	1500	2200
	34	750	1150	800	1300	950	1500	750	1200	850	1350	1000	1550	850	1300	950	1400	1100	1650
	51	500	850	550	950	650	1100	500	850	600	1000	700	1150	550	900	600	1050	750	1200
11,000	0	1850	2700	2000	2950	2250	3300	1950	2800	2100	3050	2400	3400	2250	3150	2400	3400	2800	3800
	17	1350	2150	1500	2300	1750	2650	1450	2200	1600	2400	1850	2700	1700	2450	1900	2700	2150	3100
	34	950	1600	1100	1750	1300	2050	1050	1650	1200	1850	1400	2100	1200	1850	1400	2050	1600	2300
	51	650	1150	750	1250	900	1500	700	1200	800	1350	950	1550	800	1250	950	1500	1150	1750
13,000	0	2300	3600	2500	3800	2800	4300	2450	3700	2650	3950	3000	4550	2900	4300	3200	4800	3600	5300
	17	1700	2800	1900	3050	2200	3400	1850	2900	2050	3200	2350	3600	2200	3300	2400	3700	2800	4200
	34	1200	2050	1400	2300	1650	2700	1350	2150	1500	2400	1750	2850	1600	2450	1800	2850	2100	3200
	51	850	1550	1000	1750	1200	2100	900	1600	1050	1800	1300	2250	1100	1700	1300	2100	1550	2700

NOTE: INCREASE CHART DISTANCES AS FOLLOWS: 75°F + 10%; 100°F + 20%; 125°F + 30%; 150°F + 40%
DATA AS OF 5-8-45

BASED ON: FLIGHT TESTS

OPTIMUM TAKE-OFF WITH 3000 RPM, 61 IN.HG. & 20 DEG.FLAP IS 80% OF CHART VALUES

CLIMB DATA

GROSS WEIGHT LB.	AT SEA LEVEL			AT 5000 FEET			AT 10,000 FEET			AT 15,000 FEET			AT 20,000 FEET			AT 25,000 FEET								
	BEST I.A.S. MPH	RATE OF CLIMB KTS	BAL. OF FUEL USED F.P.M.	BEST I.A.S. MPH	RATE OF CLIMB KTS	FROM SEA LEVEL TIME MIN. FUEL USED	BEST I.A.S. MPH	RATE OF CLIMB KTS	FROM SEA LEVEL TIME MIN. FUEL USED	BEST I.A.S. MPH	RATE OF CLIMB KTS	FROM SEA LEVEL TIME MIN. FUEL USED	BEST I.A.S. MPH	RATE OF CLIMB KTS	FROM SEA LEVEL TIME MIN. FUEL USED	BEST I.A.S. MPH	RATE OF CLIMB KTS	FROM SEA LEVEL TIME MIN. FUEL USED						
9000	170	145	2200	15	170	145	2200	2.5	19	170	145	2250	5.0	23	170	145	1900	10.0	31	160	140	1650	13.0	35
11,000	170	145	1500	15	170	145	1500	3.5	20	170	145	1500	7.0	26	170	145	1150	14.0	39	160	140	900	19.0	47
13,000	175	150	1000	15	175	150	950	5.5	23	175	150	900	11.0	32	175	150	850	17.0	42	170	145	550	23.0	75

POWER PLANT SETTINGS: (DETAILS ON FIG. SECTION III):
DATA AS OF 5-8-45

BASED ON: FLIGHT TESTS

FUEL USED (U.S. GAL.) INCLUDES WARM-UP & TAKE-OFF ALLOWANCE

LANDING DISTANCE FEET

GROSS WEIGHT LB.	BEST IAS APPROACH				HARD DRY SURFACE				FIRM DRY SOD				WET OR SLIPPERY									
	POWER OFF		POWER ON		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET	
	MPH	KTS	MPH	KTS	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.	GROUND ROLL	TO CLEAR 50' OBJ.
	9000	130	115	130	115	1200	2300	1400	2400	1500	2600	1400	2400	1600	2600	1700	2800	3200	4300	3500	4600	3900
8000	130	115	130	115	1100	2100	1200	2200	1400	2400	1300	2200	1400	2400	1500	2600	2900	3800	3100	4100	3400	4500

DATA AS OF 5-8-45

BASED ON: FLIGHT TESTS

OPTIMUM LANDING IS 80% OF CHART VALUES

REMARKS:

NOTE: TO DETERMINE FUEL CONSUMPTION IN BRITISH IMPERIAL GALLONS, MULTIPLY BY 10, THEN DIVIDE BY 12

MIXTURE: USE "RUN" OR "AUTO RICH - AUTO LEAN"

I.A.S. : INDICATED AIRSPEED
M.P.H. : MILES PER HOUR
KTS. : KNOTS
F.P.M. : FEET PER MINUTE

For use with V-1650-3 engine only regardless of airplane model.

Figure 64—Take-off, Climb and Landing Chart

For use with V-1650-3 engine only regardless of airplane model.

Figure 65—Flight Operation Instruction Chart—No External Load

For use with V-1650-3 engine only regardless of airplane model.

AFMC-328 4-1-44		AIRCRAFT MODEL(S) P-51D AND P-51K ENGINE(S): V-1650-3						FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS WING RACKS											
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ⁽¹⁾ MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (M./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽²⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.										
WAR EMERG		3000	67	LOW HIGH	RUN	5 MIN.		187 168	FOR DETAILS SEE POWER PLANT CHART (FIG. 111)																				
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153																					
COLUMN I		FUEL		COLUMN II		COLUMN III		COLUMN IV		FUEL		COLUMN V																	
RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES																	
STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL															
860		750		269		1130		SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽³⁾		269		1620		1410															
770		670		240		1010		980 1340 1200		240		1450		1260															
700		610		220		920		800		220		1330		1150															
640		560		200		840		730		200		1210		1050															
580		500		180		760		660		180		1090		940															
510		440		160		670		580		160		970		840															
450		390		140		590		510		140		850		730															
380		330		120		500		440		120		730		630															
320		280		100		420		360		100		600		520															
260		220		80		340		290		80		480		420															
190		170		60		250		220		60		360		310															
130		110		40		170		150		40		240		210															
MAXIMUM CONTINUOUS				PRESS (4.2 STAT. (3.65 NAUT.) MI./GAL.)				(5.0 STAT. (4.35 NAUT.) MI./GAL.)				(5.75 STAT. (5.0 NAUT.) MI./GAL.)				PRESS				MAXIMUM AIR RANGE									
R.P.M.		M.P. INCHES		MIX- TURE		APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES		MIX- TURE		APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES		MIX- TURE		APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET	
2700		F.T.		RUN		90 420 365		40000		2600		F.T.		RUN		80 405 350		40000		2000		F.T.		RUN		48 280 245		20000	
2700		46		RUN		100 425 370		35000		2350		F.T.		RUN		79 395 345		35000		2000		46		RUN		45 270 235		15000	
2700		46		RUN		96 395 345		25000		2600		45		RUN		83 395 345		25000		2000		37		RUN		56 320 280		15000	
2700		46		RUN		119 405 350		20000		2450		F.T.		RUN		90 380 330		20000		1900		F.T.		RUN		48 280 245		1700	
2700		46		RUN		115 380 330		15000		2300		41		RUN		86 360 310		15000		1700		F.T.		RUN		45 270 235		15000	
2700		46		RUN		110 360 310		10000		2300		41		RUN		80 335 290		10000		1600		31		RUN		44 260 225		10000	
2700		46		RUN		106 340 295		5000		2300		41		RUN		75 315 275		5000		1600		31		RUN		41 245 215		5000	
2700		46		RUN		101 320 280		S.L.		2300		41		RUN		73 300 260		S.L.		1600		31		RUN		38 220 200		S.L.	
SPECIAL NOTES																													
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.																													
HIGH BLOWER ABOVE HEAVY LINE																													
EXAMPLE																													
AT 10,000 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 40 GAL.) TO FLY 1250 STAT. AIRMILES AT 25,000 FT. ALTITUDE MAINTAIN 2000 RPM AND 32 IN. MANIFOLD PRESSURE WITH MIXTURE SET: RUN																													
LEGEND																													
ALT. : PRESSURE ALTITUDE M.P. : MANIFOLD PRESSURE GPH : U.S. GAL. PER HOUR TAS : TRUE AIRSPEED KTS. : KNOTS S.L. : SEA LEVEL														F.R. : FULL RICH A.R. : AUTO-RICH A.L. : AUTO-LEAN C.L. : CRUISING LEAN M.L. : MANUAL LEAN F.T. : FULL THROTTLE															
DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA																													

For use with V-1650-3 engine only regardless of airplane model.

AN 01-601E-1

Appendix I

AFPM-528 8-1-44		AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 2 - 500-POUND WING BOMBS														
ENGINE(S): V-1650-3												CHART WEIGHT LIMITS: 11,000 TO 10,000 POUNDS																								
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. 1, SECT. III)				INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.												NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.											
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 188																												
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		187 188																												
COLUMN I												FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V								
RANGE IN AIRMILES												U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES								
STATUTE NAUTICAL												GAL.		STATUTE NAUTICAL				STATUTE NAUTICAL				STATUTE NAUTICAL				GAL.		STATUTE NAUTICAL								
790 680												269		1000 870				1200 1040				1380 1190				269		1440 1250								
700 610												240		900 780				1070 930				1230 1060				240		1290 1120								
640 560												220		830 720				980 850				1130 980				220		1190 1020								
590 510												200		750 650				900 770				1020 890				200		1080 930								
530 460												180		680 590				810 700				920 800				180		980 840								
470 410												160		610 530				720 620				820 710				160		870 750								
MAXIMUM CONTINUOUS												PRESS		(3.6 STAT. (3.10 NAUT.) MI./GAL.)				(4.4 STAT. (3.80 NAUT.) MI./GAL.)				(5.1 STAT. (4.45 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE								
R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		ALT. FEET		R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		ALT. FEET		R.P.M.		M.P. INCHES	MIX- TURE	APPROX.				
				TOT. GPH.	T.A.S. MPH.	T.A.S. KTS.						TOT. GPH.	T.A.S. MPH.	T.A.S. KTS.					TOT. GPH.	T.A.S. MPH.	T.A.S. KTS.							TOT. GPH.	T.A.S. MPH.	T.A.S. KTS.						
							40000 35000 30000																				40000 35000 30000									
2700		46	RUN	96	360	310	25000								2200		39	RUN	76	325	290							25000								
2700		46	RUN	119	370	320	20000	2550		F.T.	RUN	99	355	310	2300		F.T.	RUN	74	325	280	2050		F.T.	RUN	65	290	20000								
2700		46	RUN	115	350	305	15000	2400		42	RUN	94	335	290	2150		F.T.	RUN	70	310	270	1900		F.T.	RUN	54	275	15000								
2700		46	RUN	110	330	285	10000	2350		42	RUN	87	315	275	2100		39	RUN	65	290	250	1750		35	RUN	50	255	10000		1600		33	RUN	45	235	205
2700		46	RUN	106	310	270	5000	2350		41	RUN	82	295	255	2100		39	RUN	63	275	240	1750		35	RUN	48	240	5000		1600		33	RUN	43	225	195
2700		46	RUN	101	295	255	S.L.	2350		41	RUN	78	280	245	2100		39	RUN	60	260	225	1750		35	RUN	45	230	S.L.		1600		33	RUN	41	215	185
SPECIAL NOTES												EXAMPLE												LEGEND												
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.												AT 11,000 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 10 GAL.) TO FLY 1100 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2050 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN												ALT. : PRESSURE ALTITUDE M.P. : MANIFOLD PRESSURE GPH. : U.S. GAL. PER HOUR TAS : TRUE AIRSPEED KTS. : KNOTS S.L. : SEA LEVEL F.R. : FULL RICH A.R. : AUTO-RICH A.L. : AUTO-LEAN C.L. : CRUISING LEAN M.L. : MANUAL LEAN F.T. : FULL THROTTLE												
HIGH BLOWER ABOVE HEAVY LINE																																				
DATA AS OF 5-8-45												BASED ON: FLIGHT TEST DATA																								

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

Figure 66 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart—Two 500-pound Bombs

For use with V-1650-3 engine only regardless of airplane model.

AFMC-328 8-1-44		AIRCRAFT MODEL(S) P-51D AND P-51K					FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 2 - 500-LB. WING BOMBS												
ENGINE(S): V-1650-3					CHART WEIGHT LIMITS: 10,400 TO 9400 POUNDS																								
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ⁽¹⁾ MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.					NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND) ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.N.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.															
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168																					
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153																					
FOR DETAILS SEE FIG. 66-111 (M.P. SEC. 111)																													
COLUMN I		FUEL		COLUMN II		COLUMN III		COLUMN IV		FUEL		COLUMN V																	
RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES																	
STATUTE NAUTICAL		GAL.		STATUTE NAUTICAL		STATUTE NAUTICAL		STATUTE NAUTICAL		GAL.		STATUTE NAUTICAL																	
						SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽¹⁾																							
540 470 410		470 410 360		184 160 140		700 610 530		610 530 460		830 720 630		720 620 540		950 820 720		820 710 630		184 160 140		1000 870 760		860 750 660							
350 290 230		300 250 200		120 100 80		460 380 300		400 330 260		540 450 360		470 390 310		620 510 410		540 450 360		120 100 80		650 540 430		560 470 380							
180 120 60		150 100 50		80 40 20		230 150 80		200 130 70		270 180 90		230 160 80		310 210 100		270 180 90		60 40 20		320 220 110		280 190 90							
MAXIMUM CONTINUOUS		PRESS		(3.8 STAT. (3.3 NAUT.) MI./GAL.)		(4.5 STAT. (3.9 NAUT.) MI./GAL.)		(5.1 STAT. (4.4 NAUT.) MI./GAL.)		PRESS		MAXIMUM AIR RANGE																	
R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		ALT. FEET		R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		ALT. FEET		R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		ALT. FEET							
TOT.		T.A.S.			TOT.		T.A.S.	TOT.		T.A.S.			TOT.		T.A.S.	TOT.		T.A.S.			TOT.		T.A.S.						
GPH.		MPH.	KTS.			GPH.		MPH.	KTS.	GPH.		MPH.	KTS.	GPH.		MPH.	KTS.	GPH.		MPH.	KTS.	GPH.		MPH.	KTS.				
						40000 35000 30000											40000 35000 30000						40000 35000 30000						
2700		46	RUN	96	365	315	25000	2600	45	RUN	92	360	310	2200	39	RUN	75	335	290										
2700		46	RUN	119	370	320	20000	2500	F.T.	RUN	93	350	305	2300	F.T.	RUN	73	330	285	2100	F.T.	RUN	57	290	250				
2700		46	RUN	115	350	305	15000	2300	41	RUN	84	325	280	2100	F.T.	RUN	68	305	265	1900	F.T.	RUN	54	275	240				
2700		46	RUN	110	330	285	10000	2300	41	RUN	82	310	270	2100	39	RUN	64	290	250	1750	36	RUN	51	260	225				
2700		46	RUN	106	310	270	5000	2300	41	RUN	77	290	250	2050	39	RUN	60	270	235	1750	36	RUN	48	245	210				
2700		46	RUN	101	295	265	S. L.	2300	41	RUN	73	275	240	2050	39	RUN	57	255	220	1750	36	RUN	45	230	200				
SPECIAL NOTES										EXAMPLE										LEGEND									
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED. HIGH BLOWER ABOVE HEAVY LINE										AT 10,000 LB. GROSS WEIGHT WITH 140 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 44 GAL.) TO FLY 700 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2100 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN										ALT.: PRESSURE ALTITUDE F.R.: FULL RICH M.P.: MANIFOLD PRESSURE A.R.: AUTO-RICH GPH.: U.S. GAL. PER HOUR A.L.: AUTO-LEAN TAS.: TRUE AIRSPEED C.L.: CRUISING LEAN KTS.: KNOTS M.L.: MANUAL LEAN S.L.: SEA LEVEL F.T.: FULL THROTTLE									
DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA																													

For use with V-1650-3 engine only regardless of airplane model.

AN 01-60JE-1

Appendix 1

For use with V-1650-3 engine only regardless of airplane model.

AFMFC-326 6-1-44		AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 2 1000-POUND BOMBS									
ENGINE(S): V-1650-3												CHART WEIGHT LIMITS: 12,000 TO 11,400 POUNDS																			
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. 1, SECT. II)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ¹⁰ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.										
WAR EMERG.	3000	67	LOW HIGH	RUN	5 MIN.		167 168																								
MILITARY POWER	3000	61	LOW HIGH	RUN	15 MIN.		167 158																								
COLUMN I				FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V											
RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES											
STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL									
770		670		269		960		830		1170		1010		1290		1120		269		1360		1180									
690		600		240		860		750		1040		900		1160		1010		240		1210		1050									
630		550		220		790		680		950		820		1060		920		220		1120		970									
570		490		200		720		620		860		750		970		840		200		1020		880									
520		450		180		650		560		770		670		870		750		180		920		800									
460		380		160		580		500		680		590		780		680		160		820		710									
MAXIMUM CONTINUOUS				PRESS		(3.5 STAT. (3.05 NAUT.) MI./GAL.)				(4.1 STAT. (3.55 NAUT.) MI./GAL.)				(4.7 STAT. (4.1 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE											
APPROX.				ALT.		APPROX.				APPROX.				APPROX.				ALT.		APPROX.											
R.P.M. INCHES MIX-TURE TOT. GPH. MPH. KTS.				FEET		R.P.M. INCHES MIX-TURE TOT. GPH. MPH. KTS.				R.P.M. INCHES MIX-TURE TOT. GPH. MPH. KTS.				R.P.M. INCHES MIX-TURE TOT. GPH. MPH. KTS.				FEET		R.P.M. INCHES MIX-TURE TOT. GPH. MPH. KTS.											
				40000 35000 30000														40000 35000 30000													
2700 46 RUN 96 350 305				25000						2400 41 RUN 81 330 285								25000													
2700 46 RUN 119 365 315				20000		2550 F.T. 42 RUN 100 350 305				2350 F.T. 40 RUN 79 325 280				2150 F.T. 38 RUN 61 285 245				20000													
2700 46 RUN 115 345 300				15000		2400 42 RUN 95 330 285				2200 40 RUN 76 310 270				2000 F.T. 37 RUN 60 280 245				15000													
2700 46 RUN 110 325 280				10000		2400 42 RUN 89 310 270				2200 40 RUN 73 295 255				1950 38 RUN 58 270 235				10000		1750 35 RUN 50 265 215											
2700 46 RUN 106 310 270				5000		2400 42 RUN 85 295 255				2150 40 RUN 66 275 240				1950 38 RUN 55 255 220				5000		1750 35 RUN 48 235 205											
2700 46 RUN 101 290 250				S.L.		2350 42 RUN 78 275 240				2150 40 RUN 63 260 225				1950 37 RUN 52 240 210				S.L.		1750 36 RUN 47 225 195											
SPECIAL NOTES																															
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.																															
HIGH BLOWER ABOVE HEAVY LINE																															
EXAMPLE																															
AT 12,000 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 100 GAL.) TO FLY 1000 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2150 RPM AND F.T. IN. MANIFOLD PRESSURE WITH MIXTURE SET: RUN																															
LEGEND																															
ALT. : PRESSURE ALTITUDE										F.R. : FULL RICH										A.R. : AUTO-RICH											
M.P. : MANIFOLD PRESSURE										A.L. : AUTO-LEAN										C.L. : CRUISING LEAN											
GPH : U.S. GAL. PER HOUR										M.L. : MANUAL LEAN										F.T. : FULL THROTTLE											
TAS : TRUE AIRSPEED																															
KTS. : KNOTS																															
S.L. : SEA LEVEL																															
DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA																															

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AFMC-328
1-1-44

AIRCRAFT MODEL(S)
P-51D, AND P-51K
ENGINE(S): V-1650-3

FLIGHT OPERATION INSTRUCTION CHART
CHART WEIGHT LIMITS: 11,400 TO 10,400 POUNDS

EXTERNAL LOAD ITEMS
2 - 1000-LB. BOMBS

LIMITS

RPM.

M.P.
IN. HG.

BLOWER
POSITION

MIXTURE
POSITION

TIME
LIMIT

CYL.
TEMP.

TOTAL
G.P.H.

FOR DETAILS SEE
POWER PLANT CHART
(FIG. 3-111)

WAR
EMERG.

3000

67

LOW
HIGH

RUN

5
MIN.

187
168

MILITARY
POWER

3000

61

LOW
HIGH

RUN

15
MIN.

167
153

INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN
EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING⁽¹⁾
MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE
EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES
TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST
DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE
(M.P.) AND MIXTURE SETTING REQUIRED.

NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. CO UMS
11, 111, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE
IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR.
(G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR
REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE
(NO WIND).⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY
U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.

COLUMN I

RANGE IN AIRMILES

STATUTE

NAUTICAL

530

440

460

400

340

290

290

230

170

110

60

FUEL

U.S.
GAL.

184

160

140

120

100

80

60

40

20

COLUMN II

RANGE IN AIRMILES

STATUTE

NAUTICAL

660

570

580

500

430

370

310

250

190

140

70

COLUMN III

RANGE IN AIRMILES

STATUTE

NAUTICAL

780

680

680

590

510

420

340

250

170

80

COLUMN IV

RANGE IN AIRMILES

STATUTE

NAUTICAL

900

780

780

690

590

490

390

290

200

100

FUEL

U.S.
GAL.

184

160

140

120

100

80

60

40

20

COLUMN V

RANGE IN AIRMILES

STATUTE

NAUTICAL

940

810

820

710

610

510

410

310

200

100

MAXIMUM CONTINUOUS

R.P.M.

M.P.
INCHES

MIX-
TURE

APPROX.
TOT.
GPH.

T.A.S.
MPH KTS.

PRESS
ALT.
FEET

40000

35000

30000

(3.6 STAT. (3.1 NAUT.) MI./GAL.)

R.P.M.

M.P.
INCHES

MIX-
TURE

APPROX.
TOT.
GPH.

T.A.S.
MPH KTS.

PRESS
ALT.
FEET

40000

35000

30000

(4.25 STAT. (3.7 NAUT.) MI./GAL.)

R.P.M.

M.P.
INCHES

MIX-
TURE

APPROX.
TOT.
GPH.

T.A.S.
MPH KTS.

PRESS
ALT.
FEET

40000

35000

30000

(4.9 STAT. (4.25 NAUT.) MI./GAL.)

R.P.M.

M.P.
INCHES

MIX-
TURE

APPROX.
TOT.
GPH.

T.A.S.
MPH KTS.

PRESS
ALT.
FEET

40000

35000

30000

2700

46

RUN

96

355

310

25000

2500

F.T.

RUN

95

345

300

2350

F.T.

RUN

77

325

280

2100

F.T.

RUN

58

280

245

20000

2700

46

RUN

119

365

315

20000

2350

41

RUN

90

325

280

2200

F.T.

RUN

74

310

270

1950

F.T.

RUN

56

270

235

15000

2700

46

RUN

115

345

300

15000

2350

41

RUN

84

305

265

2150

40

RUN

70

290

250

1850

36

RUN

54

260

225

10000

2700

46

RUN

110

325

280

10000

2350

41

RUN

81

290

250

2150

40

RUN

67

275

240

1850

36

RUN

51

245

210

5000

2700

46

RUN

106

305

265

5000

2350

41

RUN

77

275

240

2150

40

RUN

62

260

225

1850

37

RUN

49

235

205

S.L.

2700

46

RUN

101

290

250

S.L.

2350

41

RUN

77

275

240

2150

40

RUN

62

260

225

1850

37

RUN

49

235

205

S.L.

SPECIAL NOTES

(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.)
PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.

HIGH BLOWER ABOVE HEAVY LINE

EXAMPLE

AT 11,000 LB. GROSS WEIGHT WITH 140 GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF 4% GAL.)
TO FLY 650 STAT. AIRMILES AT 20,000 FT. ALTITUDE
MAINTAIN 2100 RPM AND F.T. IN MANIFOLD PRESSURE
WITH MIXTURE SET: RUN

LEGEND

ALT. : PRESSURE ALTITUDE F.R. : FULL RICH
M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH
GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN
TAS : TRUE AIRSPEED C.L. : CRUISING LEAN
KTS. : KNOTS M.L. : MANUAL LEAN
S.L. : SEA LEVEL F.T. : FULL THROTTLE

DATA AS OF 5-8-45

BASED ON: FLIGHT TEST DATA

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AN 01-60JE-1

Appendix I

AFMC-528 8-1-83		AIRCRAFT MODEL(S) P-51D AND P-51K					FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 2 - 75-GALLON COMBAT TANKS											
ENGINE(S): V-1650-3					CHART WEIGHT LIMITS: 11,000 TO 10,000 POUNDS																							
LIMITS		RPM	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.									
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168																				
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153																				
COLUMN I		FUEL		COLUMN II		COLUMN III		COLUMN IV		FUEL		COLUMN V																
RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES																
STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL		STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL										
1220 1170		1060 1010		419 400		1530 1480		1330 1270		1870 1790		1620 1540		2190 2090		1900 1820		419 400		2270 2170		1970 1880						
1110 1050 990		960 910 860		380 360 340		1390 1320 1250		1200 1140 1080		1700 1610 1520		1470 1390 1320		1990 1890 1790		1730 1640 1550		380 360 340		2060 1960 1850		1790 1700 1610						
930 880 820		710 760 710		320 300 280		1180 1100 1030		1020 950 890		1430 1350 1260		1240 1160 1090		1690 1580 1480		1460 1380 1290		320 300 280		1750 1640 1540		1510 1420 1330						
760		660		260		960		830		1170		1010		1380		1200		260		1430		1240						
MAXIMUM CONTINUOUS		PRESS		8.6 STAT. (3.1 NAUT.) MI./GAL.		(4.4 STAT. (3.8 NAUT.) MI./GAL.)		(5.1 STAT. (4.4 NAUT.) MI./GAL.)		PRESS		MAXIMUM AIR RANGE																
R.P.M.	M.P. INCHES	MIX- TURE	APPROX.		ALT. FEET	R.P.M.	M.P. INCHES	MIX- TURE	APPROX.		R.P.M.	M.P. INCHES	MIX- TURE	APPROX.		ALT. FEET	R.P.M.	M.P. INCHES	MIX- TURE	APPROX.								
TOT.		T.A.S.		TOT.		T.A.S.		TOT.		T.A.S.		TOT.		T.A.S.														
GPH.		MPH	KTS.	GPH.		MPH	KTS.	GPH.		MPH	KTS.	GPH.		MPH	KTS.	GPH.		MPH	KTS.	GPH.		MPH	KTS.					
2700	46	RUN	100	385	335	40000 35000 30000					2400	F.T.	RUN	81	355	310				40000 35000 30000								
2700	46	RUN	96	360	310	25000					2200	39	RUN	76	335	290				25000								
2700	46	RUN	119	370	320	20000	2550	F.T.	RUN	99	355	310	2300	F.T.	RUN	74	325	280	2050	F.T.	RUN	55	275	240	20000			
2700	46	RUN	115	350	305	15000	2400	42	RUN	94	335	290	2150	F.T.	RUN	70	310	270	1900	F.T.	RUN	54	270	235	15000			
2700	46	RUN	110	330	285	10000	2350	42	RUN	87	315	275	2100	39	RUN	65	290	250	1750	35	RUN	50	255	220	10000			
2700	46	RUN	106	310	270	5000	2350	41	RUN	82	295	255	2100	39	RUN	63	275	240	1750	35	RUN	48	240	210	5000			
2700	46	RUN	101	295	255	S.L.	2350	41	RUN	78	280	245	2100	39	RUN	60	260	225	1750	36	RUN	45	230	200	S.L.			
SPECIAL NOTES																												
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.																												
HIGH BLOWER ABOVE HEAVY LINE																												
EXAMPLE																												
AT 11,000 LB. GROSS WEIGHT WITH 300 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 50 GAL.) TO FLY 1800 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2050 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN																												
LEGEND																												
ALT. : PRESSURE ALTITUDE F.R. : FULL RICH M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN TAS : TRUE AIRSPEED C.L. : CRUISING LEAN KTS. : KNOTS M.L. : MANUAL LEAN S.L. : SEA LEVEL F.T. : FULL THROTTLE																												
DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA																												

For use with V-1650-3 engine only regardless of airplane model.

Figure 68 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—Two 75-gallon Tanks
For use with V-1650-7 engine only regardless of airplane model.

Figure 68 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart—Two 75-gallon Tanks

For use with V-1650-3 engine only regardless of airplane model.

AFMC-328 5-1-44		AIRCRAFT MODEL(S) P-51D AND P-51K						FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 2 - 75-GALLON COMBAT TANKS					
ENGINE(S):		V-1650-3						CHART WEIGHT LIMITS: 10,000 TO 8800 POUNDS															
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ^(D) MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.						NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ^(D) TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.								
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168	FOR DETAILS SEE POWER PLANT CHART (FIG. 3-2-111)														
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153															
COLUMN I		FUEL		COLUMN II		COLUMN III		COLUMN IV		FUEL		COLUMN V											
RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES											
STATUTE		GAL.		STATUTE		STATUTE		STATUTE		GAL.		STATUTE											
NAUTICAL				NAUTICAL		NAUTICAL		NAUTICAL				NAUTICAL											
790 710		690 610		269 240		990 890		860 770		1210 1080		1050 940											
650 590 530		560 510 460		220 200 180		810 740 670		710 640 580		990 900 810		860 780 700											
470 410 350 290		410 360 310 250		160 140 120 100		590 520 440 370		510 450 380 320		720 630 540 450		620 550 470 390											
240 180 120		200 150 100		80 60 40		300 220 150		260 190 130		360 270 180		310 230 160											
MAXIMUM CONTINUOUS		PRESS		{ 3.7 STAT. (3.2 NAUT.) MI./GAL. }		{ 4.5 STAT. (3.9 NAUT.) MI./GAL. }		{ 5.3 STAT. (4.6 NAUT.) MI./GAL. }		PRESS		MAXIMUM AIR RANGE											
R.P.M.		M.P.		MIX-TURE		APPROX.		R.P.M.		M.P.		MIX-TURE		APPROX.									
INCHES		TOT.		T.A.S.		TOT.		T.A.S.		TOT.		T.A.S.		TOT.									
		GPH.		MPH.		KTS.		GPH.		MPH.		KTS.		GPH.									
2700		F.T.		RUN		90 380 330		40000						40000									
2700		46		RUN		100 385 335		35000		2350		F.T.		RUN									
2700		46		RUN		96 360 310		25000		2200		40		RUN									
2700		46		RUN		119 370 320		20000		2300		F.T.		RUN									
2700		46		RUN		115 350 305		15000		2100		F.T.		RUN									
2700		46		RUN		110 330 285		10000		2100		39		RUN									
2700		46		RUN		106 310 270		5000		2100		39		RUN									
2700		46		RUN		101 295 255		S.L.		2100		39		RUN									
2700		46		RUN		101 295 255		S.L.		2100		39		RUN									
SPECIAL NOTES																							
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.																							
HIGH BLOWER ABOVE HEAVY LINE																							
EXAMPLE																							
AT 10,000 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 40 GAL.) TO FLY 1150 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 1950 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN																							
LEGEND																							
ALT. : PRESSURE ALTITUDE								F.R. : FULL RICH															
M.P. : MANIFOLD PRESSURE								A.R. : AUTO-RICH															
GPH. : U.S. GAL. PER HOUR								A.L. : AUTO-LEAN															
TAS. : TRUE AIRSPEED								C.L. : CRUISING LEAN															
KTS. : KNOTS								M.L. : MANUAL LEAN															
S.L. : SEA LEVEL								F.T. : FULL THROTTLE															
DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA																							

For use with V-1650-3 engine only regardless of airplane model.

AN 01-601E-1

Appendix I

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AFMC-528 8-1-44		AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 2 - 110-GALLON COMBAT TANKS									
ENGINE(S): V-1650-3										CHART WEIGHT LIMITS: 11,600 TO 10,200 POUNDS																					
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ⁽¹⁾ MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.												
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168	FOR DETAILS SEE CHART "A" (FIG. 1-111)																						
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		187 158																							
COLUMN I										FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V					
RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES											
STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL									
1410 1330		1220 1150		489 480		1740 1640		1510 1420		2100 1980		1820 1720		2450 2310		2120 2000		489 480		2540 2400		2210 2090									
1270 1210 1150		1100 1050 1000		440 420 400		1570 1500 1430		1360 1300 1240		1900 1810 1730		1640 1570 1500		2210 2120 2020		1920 1840 1750		440 420 400		2300 2200 2100		2000 1910 1830									
1100 1040 980		950 900 850		380 360 340		1360 1290 1220		1180 1110 1050		1640 1560 1480		1430 1350 1280		1930 1830 1730		1670 1590 1500		380 360 340		2000 1900 1800		1740 1650 1570									
920 870 810 750		800 750 700 650		320 300 280 260		1150 1080 1010 940		990 930 870 810		1380 1310 1220 1140		1210 1140 1060 990		1640 1540 1450 1350		1420 1340 1250 1170		320 300 280 260		1700 1600 1500 1400		1480 1390 1290 1220									
MAXIMUM CONTINUOUS				PRESS		(3.5 STAT. (3.05 NAUT.) MI./GAL.)				(4.2 STAT. 3.65 NAUT.) MI./GAL.)				(4.8 STAT. (4.15 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE											
R.P.M.		M.P. INCHES	MIX- TURE	APPROX. TOT. T.A.S.		ALT. FEET		R.P.M.		M.P. INCHES	MIX- TURE	APPROX. TOT. T.A.S.		ALT. FEET		R.P.M.		M.P. INCHES	MIX- TURE	APPROX. TOT. T.A.S.		ALT. FEET		R.P.M.		M.P. INCHES	MIX- TURE	APPROX. TOT. T.A.S.			
				GPH.	MPH.	KTS.						GPH.	MPH.	KTS.						GPH.	MPH.	KTS.						GPH.	MPH.	KTS.	
2700		46	RUN	100	375	325									2400	F.T.	RUN	83	345	300											
2700		46	RUN	96	355	310	25000								2350	41	RUN	81	335	290											
2700		46	RUN	119	365	315	20000	2550	F.T.	RUN	98	350	305	2350	F.T.	RUN	77	325	280	2150	F.T.	RUN	62	290	250	20000					
2700		46	RUN	115	345	300	15000	2400	42	RUN	94	330	285	2200	F.T.	RUN	75	310	270	2000	F.T.	RUN	59	280	245	15000					
2700		46	RUN	110	325	280	10000	2400	42	RUN	93	315	275	2200	40	RUN	71	295	255	1900	37	RUN	56	265	230	10000	1700	35	RUN		
2700		46	RUN	106	310	270	5000	2400	42	RUN	84	295	255	2100	40	RUN	65	275	240	1900	37	RUN	53	250	215	5000	1700	35	RUN		
2700		46	RUN	101	295	255	S.L.	2400	42	RUN	80	280	245	2100	40	RUN	62	260	225	1950	37	RUN	52	240	210	S.L.	1750	36	RUN		
SPECIAL NOTES										EXAMPLE										LEGEND											
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.										AT 11,500 LB. GROSS WEIGHT WITH 440 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 48 GAL.) TO FLY 2100 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2150 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN										ALT. : PRESSURE ALTITUDE F.R. : FULL RICH M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN TAS. : TRUE AIRSPEED C.L. : CRUISING LEAN KTS. : KNOTS M.L. : MANUAL LEAN S.L. : SEA LEVEL F.T. : FULL THROTTLE											
HIGH BLOWER ABOVE HEAVY LINE																															
DATA AS OF 5-8-45										BASED ON: FLIGHT TEST DATA																					

For use with V-1650-3 engine only regardless of airplane model.

AFMFC-138
4-1-44

AIRCRAFT MODEL(S)
P-51D AND P-51K

FLIGHT OPERATION INSTRUCTION CHART

EXTERNAL LOAD ITEMS
2 - 110-GALLON COMBAT TANKS

ENGINE(S): V-1650-3

CHART WEIGHT LIMITS: 10,200 TO 9000 POUNDS

LIMITS	RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. SEC. III)
WAR EMERG	3000	67	LOW	RUN	5 MIN.		167 168	
MILITARY POWER	3000	61	LOW	RUN	15 MIN.		167 153	

INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN
EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING.
MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE
EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES
TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST
DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE
(M.P.) AND MIXTURE SETTING REQUIRED.

NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS
II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE
IN SPEED. AIR MILES PER GALLON (M./GAL.) (NO WIND), GALLONS PER HR.
(G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR
REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE
(NO WIND). TO OBTAIN BRITISH IMPERIAL GAL (OR G.P.H.): MULTIPLY
U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.

COLUMN I		FUEL	COLUMN II		COLUMN III		COLUMN IV		FUEL	COLUMN V	
RANGE IN AIRMILES		U.S.	RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.	RANGE IN AIRMILES	
STATUTE	NAUTICAL	GAL.	STATUTE	NAUTICAL	STATUTE	NAUTICAL	STATUTE	NAUTICAL	GAL.	STATUTE	NAUTICAL
770 690	670 600	269 240	970 860	840 750	1180 1050	1030 920	1400 1260	1210 1080	269 240	1450 1300	1260 1120
630 570 510	550 500 450	220 200 180	790 720 650	690 620 560	970 880 790	840 760 690	1140 1040 940	990 900 810	220 200 180	1190 1080 970	1030 940 840
460 400 340	400 350 300	180 140 120	580 500 430	500 440 370	700 620 530	610 530 460	830 730 620	720 630 540	180 140 120	860 760 650	750 660 560
290 230 170 110	250 200 150 100	100 80 60 40	360 290 220 140	310 250 190 120	440 360 280 180	380 310 230 150	520 420 310 210	450 360 270 180	100 80 60 40	540 430 320 220	470 370 280 190

MAXIMUM CONTINUOUS						PRESS	(3.6 STAT. (3.1 NAUT.) MI./GAL.)						(4.4 STAT. (3.8 NAUT.) MI./GAL.)						(5.2 STAT. (4.5 NAUT.) MI./GAL.)						PRESS	MAXIMUM AIR RANGE						
APPROX.						ALT. FEET	APPROX.						APPROX.						APPROX.						ALT. FEET	APPROX.						
R.P.M.	M.P. INCHES	MIX- TURE	TOT. GPH.	T.A.S. MPH.	KTS.		R.P.M.	M.P. INCHES	MIX- TURE	TOT. GPH.	T.A.S. MPH.	KTS.	R.P.M.	M.P. INCHES	MIX- TURE	TOT. GPH.	T.A.S. MPH.	KTS.	R.P.M.	M.P. INCHES	MIX- TURE	TOT. GPH.	T.A.S. MPH.	KTS.		R.P.M.	M.P. INCHES	MIX- TURE	TOT. GPH.	T.A.S. MPH.	KTS.	
2700	F.T.	RUN	90	375	325	40000																										
2700	46	RUN	100	380	330	35000							2250	F.T.	RUN	79	350	305														
2700	46	RUN	96	360	310	25000							2250	40	RUN	77	335	290	2150	F.T.	RUN	54	275	240	25000							
2700	46	RUN	119	365	315	20000	2550	F.T.	RUN	98	350	305	2300	F.T.	RUN	75	325	280	1950	F.T.	RUN	52	265	230	20000							
2700	46	RUN	115	345	300	15000	2400	42	RUN	94	330	285	2150	F.T.	RUN	70	305	265	1850	F.T.	RUN	51	260	225	15000							
2700	46	RUN	110	330	285	10000	2350	41	RUN	85	310	270	2100	39	RUN	67	290	250	1650	35	RUN	49	250	215	10000	1600	30	RUN	43	225	195	
2700	46	RUN	106	310	270	5000	2350	41	RUN	80	290	250	2100	39	RUN	61	270	235	1650	34	RUN	46	235	205	5000	1600	30	RUN	40	215	185	
2700	46	RUN	101	290	250	S.L.	2350	41	RUN	75	275	240	2100	39	RUN	58	255	220	1650	34	RUN	43	220	190	S.L.	1600	31	RUN	38	205	180	

SPECIAL NOTES

(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.)
PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.

HIGH BLOWER ABOVE HEAVY LINE

EXAMPLE

AT 10,000 LB. GROSS WEIGHT WITH 200 GAL. OF FUEL
(AFTER DEDUCTING TOTAL ALLOWANCES OF 30 GAL.)
TO FLY 1100 STAT. AIRMILES AT 20,000 FT. ALTITUDE
MAINTAIN 2500 RPM AND F.T. IN MANIFOLD PRESSURE
WITH MIXTURE SET: RUN

LEGEND

ALT. : PRESSURE ALTITUDE F.R. : FULL RICH
M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH
GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN
TAS : TRUE AIRSPEED C.L. : CRUISING LEAN
KTS. : KNOTS M.L. : MANUAL LEAN
S.L. : SEA LEVEL F.T. : FULL THROTTLE

DATA AS OF: 5-8-45 BASED ON: FLIGHT TEST DATA

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

Figure 70—Flight Operation Instruction Chart—10 Rockets

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AIRCRAFT MODEL(S) P-51D AND P-51K		FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 10 ROCKETS																			
ENGINE(S): V-1650-3		CHART WEIGHT LIMITS: 10,600 TO 9000 POUNDS																													
LIMITS	RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ⁽¹⁾ MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.						NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V-GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND) ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.																	
WAR EMERG.	3000	67	LOW HIGH	RUN	5 MIN.		187 168																								
MILITARY POWER	3000	61	LOW HIGH	RUN	15 MIN.		167 153																								
COLUMN I		FUEL		COLUMN II		COLUMN III		COLUMN IV		FUEL		COLUMN V																			
RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES																			
STATUTE NAUTICAL		GAL.		STATUTE NAUTICAL		STATUTE NAUTICAL		STATUTE NAUTICAL		GAL.		STATUTE NAUTICAL																			
740 680		650 580		269 240		890 790		770 680		1080 960		930 830		1230 1100		1080 960		269 240		1300 1160		1130 1010									
610 550 500		530 480 430		220 200 180		720 660 590		630 570 510		880 800 720		760 690 620		1010 920 830		880 800 720		220 200 180		1080 970 870		920 840 760									
440 390 330		380 340 290		160 140 120		530 460 400		460 400 340		640 560 480		550 490 420		740 640 550		640 560 480		160 140 120		770 680 580		670 590 500									
280 220 170 110		240 190 140 100		100 80 60 40		330 260 200 130		290 230 170 110		400 320 240 160		350 280 210 140		480 370 280 180		400 320 240 160		100 80 60 40		480 390 290 190		420 340 250 170									
MAXIMUM CONTINUOUS				PRESS (3.3 STAT. (2.8 NAUT.) MI./GAL.)				PRESS (4.0 STAT. (3.45 NAUT.) MI./GAL.)				PRESS (4.6 STAT. (4.00 NAUT.) MI./GAL.)				PRESS				MAXIMUM AIR RANGE											
R.P.M. M.P. MIX- INCHES TURE				APPROX. TOT. T.A.S. GPH. MPH. KTS.				R.P.M. M.P. MIX- INCHES TURE				APPROX. TOT. T.A.S. GPH. MPH. KTS.				R.P.M. M.P. MIX- INCHES TURE				APPROX. TOT. T.A.S. GPH. MPH. KTS.				R.P.M. M.P. MIX- INCHES TURE				APPROX. TOT. T.A.S. GPH. MPH. KTS.			
2700 F.T. RUN 90 345 300				40000				2700 F.T. RUN 90 345 300				40000				2700 F.T. RUN 90 345 300				40000				2700 F.T. RUN 90 345 300				40000			
2700 46 RUN 100 360 310				35000				2700 46 RUN 100 360 310				35000				2700 46 RUN 100 360 310				35000				2700 46 RUN 100 360 310				35000			
2700 46 RUN 96 340 295				25000				2700 46 RUN 96 340 295				25000				2700 46 RUN 96 340 295				25000				2700 46 RUN 96 340 295				25000			
2700 46 RUN 119 350 305				20000				2700 46 RUN 119 350 305				20000				2700 46 RUN 119 350 305				20000				2700 46 RUN 119 350 305				20000			
2700 46 RUN 115 335 290				15000				2700 46 RUN 115 335 290				15000				2700 46 RUN 115 335 290				15000				2700 46 RUN 115 335 290				15000			
2700 46 RUN 110 315 275				10000				2700 46 RUN 110 315 275				10000				2700 46 RUN 110 315 275				10000				2700 46 RUN 110 315 275				10000			
2700 46 RUN 106 300 260				5000				2700 46 RUN 106 300 260				5000				2700 46 RUN 106 300 260				5000				2700 46 RUN 106 300 260				5000			
2700 46 RUN 101 280 245				S.L.				2700 46 RUN 101 280 245				S.L.				2700 46 RUN 101 280 245				S.L.				2700 46 RUN 101 280 245				S.L.			
SPECIAL NOTES				EXAMPLE				LEGEND																							
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.				AT 10,500 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 40 GAL.) TO FLY 1000 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2150 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN				ALT. : PRESSURE ALTITUDE F.R. : FULL RICH M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN TAS : TRUE AIRSPEED C.L. : CRUISING LEAN KTS. : KNOTS M.L. : MANUAL LEAN S.L. : SEA LEVEL F.T. : FULL THROTTLE																							
HIGH BLOWER ABOVE HEAVY LINE																															
DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA																															

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AFPM-328 E-1-42		AIRCRAFT MODEL(S) P-51D AND P-51K						FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 6 ROCKETS PLUS 2 - 1000-LB. BOMBS																	
ENGINE(S):		V-1650-3						CHART WEIGHT LIMITS: 12,600 TO 12,000 POUNDS																											
LIMITS		RPM.		M.P. IN. HG.		BLOWER POSITION		MIXTURE POSITION		TIME LIMIT		CYL. TEMP.		TOTAL G.P.H.		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.									
WAR EMERG.		3000		67		LOW		RUN		5 MIN.				187																					
MILITARY POWER		3000		61		LOW		RUN		15 MIN.				167																					
						HIGH								153																					
																FOR DETAILS SEE POWER PLANT CHART (FIG. 1-11)																			
COLUMN I				FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V															
RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES															
STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL													
710		620		269		830		710		960		830		1090		940		269		1130		980													
630		550		240		740		640		860		740		980		840		240		1010		880													
580		510		220		680		590		790		680		900		780		220		930		810													
530		460		200		620		530		720		620		820		710		200		850		730													
470		420		180		560		480		650		560		740		640		180		760		660													
420		370		160		500		430		580		500		660		570		160		680		590													
MAXIMUM CONTINUOUS				PRESS		(3.0 STAT. (2.6 NAUT.) MI./GAL.)				(3.5 STAT. (3.05 NAUT.) MI./GAL.)				(3.9 STAT. (3.49 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE															
R.P.M.		M.P. INCHES		MIX-TURE		APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES		MIX-TURE		APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES		MIX-TURE		APPROX. TOT. T.A.S. GPH. MPH. KTS.									
								40000 35000 30000										40000 35000 30000																	
2700		46		RUN		96 310 270		25000		2600		F.T.		RUN		105 320 280		2450		F.T.		RUN		86 300 260		25000									
2700		46		RUN		119 330 285		20000		2600		43		RUN		105 320 280		2450		41		RUN		81 285 245		20000									
2700		46		RUN		115 315 275		15000		2450		43		RUN		100 305 265		2250		41		RUN		81 285 245		15000									
2700		46		RUN		110 300 260		10000		2500		43		RUN		98 290 250		2300		41		RUN		80 275 240		2100									
2700		46		RUN		106 285 245		5000		2500		43		RUN		94 275 240		2300		41		RUN		76 260 225		2100									
2700		46		RUN		101 270 235		S. L.		2500		43		RUN		88 260 225		2250		41		RUN		70 245 215		2100									
SPECIAL NOTES										EXAMPLE										LEGEND															
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.										AT 12,500 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 90 GAL.) TO FLY 900 STAT. AIRMILES AT 15,000 FT. ALTITUDE MAINTAIN 2100 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN										ALT. : PRESSURE ALTITUDE F.R. : FULL RICH M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN TAS : TRUE AIRSPEED C.L. : CRUISING LEAN KTS. : KNOTS M.L. : MANUAL LEAN S.L. : SEA LEVEL F.T. : FULL THROTTLE															
HIGH BLOWER ABOVE HEAVY LINE																																			
DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA																																			

For use with V-1650-3 engine only regardless of airplane model.

AN 01-60JF-1

Appendix I

For use with V-1650-3 engine only regardless of airplane model.

AFMC-528 E-1-48		AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 6 ROCKETS AND 2 - 1000-LB. BOMBS									
ENGINE(S): V-1650-3										CHART WEIGHT LIMITS: 12,000 TO 11,000 POUNDS																					
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. 1, SECT. III)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ⁽¹⁾ MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.										
WAR EMERG.		3000	67	LOW	RUN	5	187	168																							
MILITARY POWER		3000	61	LOW	RUN	15	167	153																							
COLUMN I										FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V					
RANGE IN AIRMILES										U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES					
STATUTE NAUTICAL										GAL.		STATUTE NAUTICAL				STATUTE NAUTICAL				STATUTE NAUTICAL				GAL.		STATUTE NAUTICAL					
490 420										184		570 490				660 570				750 650				184		780 680					
420 370										160 140		500 430				580 500				660 570				160 140		680 590					
320 260 210										120 100 80		370 310 250				430 360 290				490 410 330				120 100 80		510 420 340					
160 110 50										80 40 20		190 120 60				220 140 70				250 160 80				60 40 20		250 170 80					
MAXIMUM CONTINUOUS										PRESS		(3.1 STAT. (2.7 NAUT.) MI./GAL.)				(3.6 STAT. (3.1 NAUT.) MI./GAL.)				(4.1 STAT. (3.55 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE					
R.P.M. M.P. INCHES MIX-TURE APPROX. TOT. T.A.S. GPH. MPH. KTS.										ALT. FEET		R.P.M. M.P. INCHES MIX-TURE APPROX. TOT. T.A.S. GPH. MPH. KTS.				R.P.M. M.P. INCHES MIX-TURE APPROX. TOT. T.A.S. GPH. MPH. KTS.				R.P.M. M.P. INCHES MIX-TURE APPROX. TOT. T.A.S. GPH. MPH. KTS.				ALT. FEET		R.P.M. M.P. INCHES MIX-TURE APPROX. TOT. T.A.S. GPH. MPH. KTS.					
										40000 35000 30000														40000 35000 30000							
2700 46 RUN 96 315 275 25000												2350 41 RUN 82 290 250												25000							
2700 46 RUN 119 335 290 20000										2550 F.T. RUN		103 320 280 2400				84 300 260 20000								20000							
2700 46 RUN 115 315 275 15000										2450 43 RUN		99 305 265 2250				79 285 245 2050				F.T. RUN 63 255 220 15000											
2700 46 RUN 110 300 260 10000										2450 43 RUN		95 290 250 2250				40 RUN 77 275 240 2050				38 RUN 61 250 215 10000				1900 37 RUN		55 230 200					
2700 46 RUN 106 285 245 5000										2450 43 RUN		91 275 240 2250				40 RUN 73 260 225 2050				38 RUN 59 240 210 5000				1900 37 RUN		54 225 195					
2700 46 RUN 101 270 235 S.L.										2450 43 RUN		84 260 225 2250				40 RUN 68 245 215 2050				38 RUN 55 225 195 S.L.				1900 37 RUN		51 215 185					
SPECIAL NOTES										EXAMPLE										LEGEND											
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.										AT 11,500 LB. GROSS WEIGHT WITH 140 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 44 GAL.) TO FLY 550 STAT. AIRMILES AT 15,000 FT. ALTITUDE MAINTAIN 2050 RPM AND F.T. IN. MANIFOLD PRESSURE WITH MIXTURE SET: RUN										ALT. : PRESSURE ALTITUDE M.P. : MANIFOLD PRESSURE GPH. : U.S. GAL. PER HOUR TAS : TRUE AIRSPEED KTS. : KNOTS S.L. : SEA LEVEL F.R. : FULL RICH A.R. : AUTO-RICH A.L. : AUTO-LEAN C.L. : CRUISING LEAN M.L. : MANUAL LEAN F.T. : FULL THROTTLE											
DATA AS OF 5-8-45										BASED ON: FLIGHT TEST DATA																					

For use with V-1650-3 engine only regardless of airplane model.

Figure 73 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—6 Rockets and Two 75-gallon Tanks

AFMC-528 8-1-44		AIRCRAFT MODEL(S) P-51D AND P-51K						FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 6 ROCKETS AND 2 - 75-GALLON COMBAT TANKS										
		ENGINE(S): V-1650-3						CHART WEIGHT LIMITS: 11,600 TO 10,600 POUNDS																				
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.N.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.N.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.N.): MULTIPLY U.S. GAL. (OR G.P.N.) BY 10 THEN DIVIDE BY 12.									
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168																				
MILITARY - POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153																				
		COLUMN I							FUEL	COLUMN II				COLUMN III				COLUMN IV				FUEL	COLUMN V					
RANGE IN AIRMILES-		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES												
STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL						
1140		990		419		1320		1150		1600		1390		1850		1600		419		1940		1690						
1090 1030		950 900		400 380		1260 1200		1100 1040		1530 1450		1330 1260		1770 1690		1530 1460		400 380		1860 1770		1620 1540						
980 920 870		850 810 760		360 340 320		1140 1080 1020		990 930 880		1380 1310 1230		1200 1140 1070		1600 1510 1430		1380 1310 1230		360 340 320		1680 1590 1500		1460 1380 1300						
820 760 710		710 670 620		300 280 260		950 890 830		830 770 720		1160 1080 1010		1010 940 880		1340 1260 1170		1160 1080 1010		300 280 260		1410 1320 1230		1230 1150 1070						
MAXIMUM CONTINUOUS		PRESS		(3.1 STAT. 2.70 NAUT.) MI./GAL.)		(3.7 STAT. (3.2 NAUT.) MI./GAL.)		(4.3 STAT. 3.75 NAUT.) MI./GAL.)		PRESS		MAXIMUM AIR RANGE																
R.P.M.		M.P. INCHES	MIX- TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES	MIX- TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES	MIX- TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET						
2700		46	RUN	100	345	300	40000 35000 30000	2700		46	RUN	96	330	285	25000	2700		46	RUN	119	345	300	20000 25000 15000					
2700		46	RUN	115	325	280	25000	2700		46	RUN	115	325	280	25000	2700		46	RUN	115	325	280	25000					
2700		46	RUN	110	305	265	10000	2700		46	RUN	106	290	250	5000	2700		46	RUN	106	290	250	5000					
2700		46	RUN	101	275	240	S.L.	2700		46	RUN	101	275	240	S.L.	2700		46	RUN	101	275	240	S.L.					
SPECIAL NOTES																												
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED. HIGH BLOWER ABOVE HEAVY LINE																												
EXAMPLE																												
AT 11,500 LB. GROSS WEIGHT WITH 360 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 50 GAL.) TO FLY 1500 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2150 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN																												
LEGEND																												
ALT. : PRESSURE ALTITUDE F.R. : FULL RICH M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN TAS : TRUE AIRSPEED C.L. : CRUISING LEAN KTS. : KNOTS M.L. : MANUAL LEAN S.L. : SEA LEVEL F.T. : FULL THROTTLE																												
DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA																												

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AN 01-60JF-1

Appendix I

For use with V-1650-3 engine only regardless of airplane model.

AFMC-228 1-1-58		AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 6 ROCKETS AND 2 - 75-GALLON COMBAT TANKS									
ENGINE(S): V-1650-3										CHART WEIGHT LIMITS: 10,600 TO 9200 POUNDS																					
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.												
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168																							
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 168																							
FOR DETAILS SEE POWER PLANT CHART (FIG. 1-111)																															
COLUMN I		FUEL		COLUMN II		COLUMN III		COLUMN IV		FUEL		COLUMN V																			
RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES																			
STATUTE NAUTICAL		GAL.		STATUTE NAUTICAL		STATUTE NAUTICAL		STATUTE NAUTICAL		GAL.		STATUTE NAUTICAL																			
740 660		640 570		269 240		860 770		750 670		1040 940		910 810		1200 1080		1040 940		269 240		1280 1140		1100 990									
600 550 490		520 480 430		220 200 180		700 640 580		610 560 500		860 780 700		740 680 610		990 900 810		860 780 700		220 200 180		1040 950 850		910 820 740									
440 380 330		380 330 280		160 140 120		510 450 380		440 390 330		620 550 470		540 470 410		770 630 540		620 550 470		160 140 120		760 660 570		660 580 490									
270 220 160 110		240 190 160 100		100 80 60 40		320 260 190 130		280 220 170 110		380 310 230 160		340 270 200 140		450 360 270 180		390 310 230 160		100 80 60 40		470 380 280 190		410 330 250 160									
MAXIMUM CONTINUOUS		PRESS		(3.2 STAT. (2.75 NAUT.) MI./GAL.)		(3.9 STAT. (3.4 NAUT.) MI./GAL.)		(4.5 STAT. (3.9 NAUT.) MI./GAL.)		PRESS		MAXIMUM AIR RANGE																			
R.P.M. M.P. MIX- TURE APPROX. ALT. FEET		R.P.M. M.P. MIX- TURE APPROX. ALT. FEET		R.P.M. M.P. MIX- TURE APPROX. ALT. FEET		R.P.M. M.P. MIX- TURE APPROX. ALT. FEET		R.P.M. M.P. MIX- TURE APPROX. ALT. FEET		R.P.M. M.P. MIX- TURE APPROX. ALT. FEET		R.P.M. M.P. MIX- TURE APPROX. ALT. FEET																			
2700 46 RUN 100 350 305 40000 35000 30000		2700 46 RUN 96 330 285 25000		2700 46 RUN 119 345 300 20000 2600 F.T. RUN 105 335 290 2350 41 RUN 81 315 275 2300 F.T. RUN 63 280 245 25000		2700 46 RUN 115 325 280 15000 2450 43 RUN 98 315 275 2200 40 RUN 79 310 270 2150 F.T. RUN 61 275 240 20000		2700 46 RUN 110 310 270 10000 2450 43 RUN 95 300 260 2200 40 RUN 73 280 245 1950 37 RUN 58 255 220 10000		2700 46 RUN 106 290 250 5000 2400 42 RUN 88 280 245 2200 40 RUN 69 265 230 1950 37 RUN 54 240 210 5000		2700 46 RUN 101 275 240 2400 42 RUN 83 265 230 2200 40 RUN 64 250 215 1950 38 RUN 53 230 200 1700 35 RUN 49 230 200 180																			
SPECIAL NOTES		EXAMPLE		LEGEND																											
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 1) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.		AT 10,500 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 40 GAL.) TO FLY 1000 STAT. AIRMILES AT 24,000 FT. ALTITUDE MAINTAIN 2100 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN		ALT. : PRESSURE ALTITUDE F.R. : FULL RICH M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN TAS. : TRUE AIRSPEED C.L. : CRUISING LEAN KTS. : KNOTS M.L. : MANUAL LEAN S.L. : SEA LEVEL F.T. : FULL THROTTLE																											
HIGH BLOWER ABOVE HEAVY LINE																															
DATA AS OF 5-8-45		BASED ON: FLIGHT TEST DATA																													

For use with V-1650-3 engine only regardless of airplane model.

AFMC-528 4-1-48		AIRCRAFT MODEL(S) P-51D AND P-51K					FLIGHT OPERATION INSTRUCTION CHART					EXTERNAL LOAD ITEMS 6 ROCKETS AND 2 - 110-GALLON COMBAT TANKS						
ENGINE(S): V-1650-3					CHART WEIGHT LIMITS: 12,200 TO 11,000 POUNDS													
LIMITS		RPM	N.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (N.P.) AND MIXTURE SETTING REQUIRED.					NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (M./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.				
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168	FOR DETAILS SEE POWER PLANT CHART (FIG. 1, SECT. III)									
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153										
COLUMN I		FUEL		COLUMN II		COLUMN III		COLUMN IV		FUEL		COLUMN V						
RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES		RANGE IN AIRMILES		RANGE IN AIRMILES		U.S.		RANGE IN AIRMILES						
STATUTE NAUTICAL		GAL.		STATUTE NAUTICAL		STATUTE NAUTICAL		STATUTE NAUTICAL		GAL.		STATUTE NAUTICAL						
1300 1220		1130 1060		489 460		1520 1430		1320 1240		1760 1660		1520 1430						
1170 1110 1010		1010 970 880		440 420 380		1370 1310 1180		1180 1130 1020		1590 1520 1440		1370 1310 1250						
950 900 850		830 780 740		360 340 320		1120 1060 1000		970 920 880		1370 1300 1230		1180 1120 1060						
800 740 690		690 650 600		300 280 260		890 870 810		810 750 700		1160 1080 1010 940		1000 930 870 810						
1810 1730 1640		1570 1500 1430		440 420 400		1890 1810 1780		1640 1570 1490		1560 1480 1400		1360 1290 1210						
2010 1890		1740 1640		489 460		2100 1980		1820 1720		1320 1230 1150 1070		1140 1070 1000 930						
390 360 340		360 340 320		380 360 340		1640 1550 1460		1420 1340 1270		320 300 280 260		1380 1290 1210 1120						
320 300 280 260		1380 1290 1210 1120		1190 1120 1040 970														
MAXIMUM CONTINUOUS		PRESS		(3.1 STAT. 6.7 NAUT.) MI./GAL.		(3.6 STAT. 8.1 NAUT.) MI./GAL.		(4.1 STAT. 6.55 NAUT.) MI./GAL.		PRESS		MAXIMUM AIR RANGE						
R.P.M. N.P. MIX- INCHES TURE		APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M. N.P. MIX- INCHES TURE		APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M. N.P. MIX- INCHES TURE		APPROX. TOT. T.A.S. GPH. MPH. KTS.				
2700 46 RUN		100 335 290		40000 35000 30000		2700 46 RUN		83 300 280		2700 46 RUN		2700 46 RUN		2700 46 RUN				
2700 46 RUN		95 320 280		25000		2700 46 RUN		86 310 270		2250 F.T. RUN		68 270 235		20000				
2700 46 RUN		119 340 295		20000		2700 46 RUN		82 295 255		2100 F.T. RUN		64 265 230		15000				
2700 46 RUN		115 320 280		15000		2700 46 RUN		79 280 245		2050 39 RUN		62 255 220		10000				
2700 46 RUN		110 305 265		10000		2700 46 RUN		74 265 230		2050 39 RUN		60 245 215		5000				
2700 46 RUN		106 290 250		5000		2700 46 RUN		70 250 215		2050 39 RUN		56 230 200		S.L.				
2700 46 RUN		101 275 240		S.L.		2700 46 RUN		2050 39 RUN		2050 39 RUN		2050 39 RUN		1950 37 RUN				
SPECIAL NOTES														EXAMPLE		LEGEND		
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 1) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED. HIGH BLOWER ABOVE HEAVY LINE														AT 12,000 LB. GROSS WEIGHT WITH 400 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 10 GAL.) TO FLY 1000 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2250 RPM AND F.T. IN. MANIFOLD PRESSURE WITH MIXTURE SET: W		ALT.: PRESSURE ALTITUDE F.R.: FULL RICH N.P.: MANIFOLD PRESSURE A.R.: AUTO-RICH GPH.: U.S. GAL. PER HOUR A.L.: AUTO-LEAN TAS.: TRUE AIRSPEED C.L.: CRUISING LEAN KTS.: KNOTS M.L.: MANUAL LEAN S.L.: SEA LEVEL F.T.: FULL THROTTLE		
DATA AS OF 5-8-45 BASED ON: FLIGHT TEST DATA																		

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AFMC-528 5-1-44		AIRCRAFT MODEL(S) P-51D AND P-51K										FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 6 ROCKETS AND 2 - 110-GALLON COMBAT TANKS													
ENGINE(S): V-1650-3												CHART WEIGHT LIMITS: 11,000 TO 9500 POUNDS																							
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. 1, SECT. III)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ¹⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.														
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168																											
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153																											
COLUMN I					FUEL		COLUMN II					COLUMN III					COLUMN IV					FUEL		COLUMN V											
RANGE IN AIRMILES					U.S.		RANGE IN AIRMILES					RANGE IN AIRMILES					RANGE IN AIRMILES					U.S.		RANGE IN AIRMILES											
STATUTE		NAUTICAL			GAL.		STATUTE		NAUTICAL			STATUTE		NAUTICAL			STATUTE		NAUTICAL			GAL.		STATUTE		NAUTICAL									
710 640		620 550			269 240		880 770		750 670			1020 910		890 790			1180 1050		1030 920			269 240		1220 1080		1060 950									
580 530 480		510 460 410			220 200 180		700 640 580		610 560 500			840 760 680		690 660 590			970 880 790		840 760 690			220 200 180		1000 910 820		870 790 710									
420 370 320		370 320 280			180 140 120		510 450 380		440 390 330			610 530 460		530 460 400			700 620 530		610 530 460			180 140 120		730 640 550		630 550 470									
260 210 160 110		230 180 140 90			100 80 60 40		320 280 190 130		280 220 170 110			380 300 230 150		330 260 200 130			440 350 260 180		380 310 230 150			100 80 60 40		450 360 270 180		390 320 240 160									
MAXIMUM CONTINUOUS					PRESS		(3.2 STAT. (2.8 NAUT.) MI./GAL.)					(3.8 STAT. (3.3 NAUT.) MI./GAL.)					(4.4 STAT. (3.8 NAUT.) MI./GAL.)					PRESS		MAXIMUM AIR RANGE											
R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		ALT. FEET	R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		R.P.M.		M.P. INCHES	MIX- TURE	APPROX.		ALT. FEET	R.P.M.		M.P. INCHES	MIX- TURE	APPROX.					
				TOT.	T.A.S.						TOT.	T.A.S.					TOT.	T.A.S.					TOT.	T.A.S.						TOT.	T.A.S.				
				GPH.	MPH.	KTS.					GPH.	MPH.	KTS.					GPH.	MPH.	KTS.					GPH.	MPH.	KTS.					GPH.	MPH.	KTS.	
2700		46	RUN	100	345	300	40000 35000 30000							2400	F.T.	RUN	84	320	280						40000 35000 30000										
2700		46	RUN	96	330	285	25000							2400	42	RUN	83	310	270						25000										
2700		46	RUN	119	340	295	20000	2550	F.T.	RUN	104	330	285	2400	F.T.	RUN	80	305	265	2150	F.T.	RUN	61	265	230	20000									
2700		46	RUN	115	320	280	15000	2450	42	RUN	97	310	270	2200	40	RUN	76	290	250	2000	F.T.	RUN	58	255	220	15000									
2700		46	RUN	110	305	265	10000	2450	42	RUN	94	295	255	2200	40	RUN	73	275	240	1900	37	RUN	56	245	215	10000	1800	36	RUN	52	230	200			
2700		46	RUN	106	290	250	5000	2400	42	RUN	85	275	240	2200	40	RUN	69	260	225	1950	37	RUN	54	235	205	5000	1800	36	RUN	50	225	195			
2700		46	RUN	101	275	240	S.L.	2400	42	RUN	80	260	225	2200	40	RUN	64	245	215	1950	37	RUN	52	225	195	S.L.	1850	36	RUN	48	215	185			
SPECIAL NOTES										EXAMPLE										LEGEND															
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED. HIGH BLOWER ABOVE HEAVY LINE										AT 11,000 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 40 GAL.) TO FLY 950 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2150 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN										ALT. : PRESSURE ALTITUDE F.R. : FULL RICH M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN TAS : TRUE AIRSPEED C.L. : CRUISING LEAN KTS. : KNOTS M.L. : MANUAL LEAN S.L. : SEA LEVEL F.T. : FULL THROTTLE															
DATA AS OF 5-8-45										BASED ON: FLIGHT TEST DATA																									

For use with V-1650-3 engine only regardless of airplane model.

Figure 74 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart—6 Rockets and Two 110-gallon Tanks

Figure 75 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—One 110-gallon Tank and One 1000-pound Bomb

AIRCRAFT MODEL(S) P-51D AND P-51K		FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 1 - 110-GALLON COMBAT TANK AND 1 - 1000-LB. BOMB																							
ENGINE(S): V-1650-3		CHART WEIGHT LIMITS: 11,900 TO 11,000 POUNDS																																	
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. 100-111)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ⁽¹⁾ MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (M.I./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.														
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168																											
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153																											
COLUMN I				FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V															
RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES															
STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL													
						SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽¹⁾																													
1080		940		379		1320		1140		1580		1370		1830		1590		379		1930		1670													
1030 970		890 840		360 340		1250 1190		1080 1030		1500 1420		1300 1230		1740 1650		1510 1430		360 340		1840 1740		1590 1510													
910 850		790 740		320 300		1120 1050		970 910		1350 1250		1170 1080		1550 1460		1340 1270		320 300		1640 1540		1420 1330													
800 740		690 640		280 260		980 910		850 790		1170 1090		1010 950		1360 1270		1180 1100		280 260		1440 1340		1250 1160													
MAXIMUM CONTINUOUS				PRESS (3.45 STAT. (3.0 NAUT.) MI./GAL.)		(4.1 STAT. (3.5 NAUT.) MI./GAL.)				(4.75 STAT. (4.1 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE																			
R.P.M.		M.P. INCHES	MIX-TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES	MIX-TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES	MIX-TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES	MIX-TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.							
						40000 35000 30000									40000 35000 30000								40000 35000 30000												
2700		46	RUN	96	350	305	25000						2400		42	RUN	83	335	290					25000											
2700		46	RUN	119	365	315	20000	2550		F.T. 43	RUN	101	350	305	2400	F.T. 75	RUN	81	330	285	2100		F.T. 59	280	245	20000									
2700		46	RUN	115	345	300	15000	2450			RUN	99	335	290	2200	F.T. 75	RUN	75	310	270	2000			275	240	15000									
2700		46	RUN	110	325	280	10000	2450		42	RUN	95	315	275	2200	40	RUN	73	295	255	1900		37	RUN	57	265	230	10000	1700		35	RUN	50	240	210
2700		46	RUN	106	310	270	5000	2400		42	RUN	86	295	255	2200	40	RUN	69	285	245	1950		37	RUN	55	255	220	5000	1750		35	RUN	48	235	205
2700		46	RUN	101	290	250	S.L.	2400		42	RUN	82	280	245	2200	40	RUN	65	265	230	1950		37	RUN	52	240	210	S.L.	1750		36	RUN	45	225	195
SPECIAL NOTES										EXAMPLE										LEGEND															
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 1) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.										AT 11,500 LB. GROSS WEIGHT WITH 320 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 59 GAL.) TO FLY 1500 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2100 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN										ALT. : PRESSURE ALTITUDE F.R. : FULL RICH M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN TAS. : TRUE AIRSPEED C.L. : CRUISING LEAN KTS. : KNOTS M.L. : MANUAL LEAN S.L. : SEA LEVEL F.T. : FULL THROTTLE															
HIGH BLOWER ABOVE HEAVY LINE																																			
DATA AS OF 5-8-45										BASED ON: FLIGHT TEST DATA																									

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AN 01-601E-1

Appendix I

Figure 75 (Sheet 1 of 2 Sheets)—Flight Operation Instruction Chart—One 110-gallon Tank and One 1000-pound Bomb

AIRCRAFT MODEL(S) P-51D AND P-51K		FLIGHT OPERATION INSTRUCTION CHART										EXTERNAL LOAD ITEMS 1 - 110-GALLON COMBAT TANK AND 1 - 1000-LB. BOMB																		
ENGINE(S): V-1650-3		CHART WEIGHT LIMITS: 11,900 TO 11,000 POUNDS																												
LIMITS		RPM.	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. 100-111)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING ⁽¹⁾ MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (M.I./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽²⁾ TO OBTAIN BRITISH IMPERIAL GAL. (OR G.P.H.): MULTIPLY U.S. GAL. (OR G.P.H.) BY 10 THEN DIVIDE BY 12.									
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168																						
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153																						
COLUMN I				FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V										
RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES										
STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL								
						SUBTRACT FUEL ALLOWANCES NOT AVAILABLE FOR CRUISING ⁽³⁾																								
1080		940		379		1320		1140		1580		1370		1830		1590		379		1930		1670								
1030 970		890 840		360 340		1250 1190		1080 1030		1500 1420		1300 1230		1740 1650		1510 1430		360 340		1840 1740		1590 1510								
910 850		790 740		320 300		1120 1050		970 910		1350 1250		1170 1080		1550 1460		1340 1270		320 300		1640 1540		1420 1330								
800 740		690 640		280 260		980 910		850 790		1170 1090		1010 950		1360 1270		1180 1100		280 260		1440 1340		1250 1160								
MAXIMUM CONTINUOUS				PRESS (3.45 STAT. (3.0 NAUT.) MI./GAL.)		(4.1 STAT. (3.5 NAUT.) MI./GAL.)				(4.75 STAT. (4.1 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE														
R.P.M.		M.P. INCHES	MIX-TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES	MIX-TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET		R.P.M.		M.P. INCHES	MIX-TURE	APPROX. TOT. T.A.S. GPH. MPH. KTS.		ALT. FEET								
						40000 35000 30000									40000 35000 30000								40000 35000 30000							
2700		46	RUN	96	350	305	25000						2400		42	RUN	83	335	290					25000						
2700		46	RUN	119	365	315	20000	2550		F.T. 43	RUN	101	350	305	2400	F.T. 43	RUN	81	330	285	2100		F.T. 43	RUN	60	280	245	20000		
2700		46	RUN	115	345	300	15000	2450			RUN	99	335	290	2200	F.T. 43	RUN	75	310	270	2000		F.T. 43	RUN	59	275	240	15000		
2700		46	RUN	110	325	280	10000	2450		42	RUN	95	315	275	2200	40	RUN	73	295	255	1900		37	RUN	57	265	230	10000		
2700		46	RUN	106	310	270	5000	2400		42	RUN	86	295	255	2200	40	RUN	69	285	245	1950		37	RUN	55	255	220	5000		
2700		46	RUN	101	290	250	S.L.	2400		42	RUN	82	280	245	2200	40	RUN	65	265	230	1950		37	RUN	52	240	210	S.L.		
SPECIAL NOTES										EXAMPLE										LEGEND										
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG. 100-111) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED.										AT 11,500 LB. GROSS WEIGHT WITH 320 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 59 GAL.) TO FLY 1500 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2100 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: RUN										ALT. : PRESSURE ALTITUDE F.R. : FULL RICH M.P. : MANIFOLD PRESSURE A.R. : AUTO-RICH GPH. : U.S. GAL. PER HOUR A.L. : AUTO-LEAN TAS. : TRUE AIRSPEED C.L. : CRUISING LEAN KTS. : KNOTS M.L. : MANUAL LEAN S.L. : SEA LEVEL F.T. : FULL THROTTLE										
HIGH BLOWER ABOVE HEAVY LINE																														
DATA AS OF 5-8-45										BASED ON: FLIGHT TEST DATA																				

For use with V-1650-3 engine only regardless of airplane model.

For use with V-1650-3 engine only regardless of airplane model.

AN 01-601E-1

Appendix I

AFMFC-528 11-1-44		AIRCRAFT MODEL(S) P-51D AND P-51K ENGINE(S): V-1850-3										FLIGHT OPERATION INSTRUCTION CHART CHART WEIGHT LIMITS: 11,000 TO 9600 POUNDS										EXTERNAL LOAD ITEMS I - 110-GALLON COMBAT TANK AND I - 1000-LB. BOMB																									
LIMITS		RPM	M.P. IN. HG.	BLOWER POSITION	MIXTURE POSITION	TIME LIMIT	CYL. TEMP.	TOTAL G.P.H.	FOR DETAILS SEE POWER PLANT CHART (FIG. 111)		INSTRUCTIONS FOR USING CHART: SELECT FIGURE IN FUEL COLUMN EQUAL TO OR LESS THAN AMOUNT OF FUEL TO BE USED FOR CRUISING. MOVE HORIZONTALLY TO RIGHT OR LEFT AND SELECT RANGE VALUE EQUAL TO OR GREATER THAN THE STATUTE OR NAUTICAL AIR MILES TO BE FLOWN. VERTICALLY BELOW AND OPPOSITE VALUE NEAREST DESIRED CRUISING ALTITUDE (ALT.) READ RPM, MANIFOLD PRESSURE (M.P.) AND MIXTURE SETTING REQUIRED.										NOTES: COLUMN I IS FOR EMERGENCY HIGH SPEED CRUISING ONLY. COLUMNS II, III, IV AND V GIVE PROGRESSIVE INCREASE IN RANGE AT A SACRIFICE IN SPEED. AIR MILES PER GALLON (MI./GAL.) (NO WIND), GALLONS PER HR. (G.P.H.) AND TRUE AIRSPEED (T.A.S.) ARE APPROXIMATE VALUES FOR REFERENCE. RANGE VALUES ARE FOR AN AVERAGE AIRPLANE FLYING ALONE (NO WIND). ⁽¹⁾ TO OBTAIN BRITISH IMPERIAL GAL (OR G.P.H.): MULTIPLY U.S. GAL (OR G.P.H.) BY 10 THEN DIVIDE BY 12.																										
WAR EMERG.		3000	67	LOW HIGH	RUN	5 MIN.		187 168																																							
MILITARY POWER		3000	61	LOW HIGH	RUN	15 MIN.		167 153																																							
COLUMN I										FUEL		COLUMN II				COLUMN III				COLUMN IV				FUEL		COLUMN V																					
RANGE IN AIRMILES										U.S.		RANGE IN AIRMILES				RANGE IN AIRMILES				RANGE IN AIRMILES				U.S.		RANGE IN AIRMILES																					
STATUTE										NAUTICAL		GAL.		STATUTE		NAUTICAL		STATUTE		NAUTICAL		STATUTE		NAUTICAL		GAL.		STATUTE		NAUTICAL																	
770 690										670 600		269 240		940 840		SUBTRACT 820 730		FUEL ALLOWANCES 1130 1010		NOT AVAILABLE FOR CRUISING ⁽¹⁾ 980 870		1320 1170		1140 1020		269 240		1390 1240		1210 1080																	
630 570 510										550 500 450		220 200 180		770 700 630		670 610 550		920 840 760		800 730 660		1080 980 880		930 850 760		220 200 180		1140 1030 930		990 900 810																	
480 400 340										400 350 300		160 140 120		560 490 420		490 430 360		670 590 500		580 510 440		780 690 590		680 590 510		160 140 120		830 720 620		720 630 540																	
290 230 170 110										250 200 150 100		100 80 60 40		350 280 210 140		300 240 180 120		420 340 250 170		360 290 220 150		490 390 290 200		420 340 250 170		100 80 60 40		520 410 310 210		450 360 270 180																	
MAXIMUM CONTINUOUS										PRESS (3.5 STAT. (3.09 NAUT.) MI./GAL.)		(4.2 STAT. (3.65 NAUT.) MI./GAL.)				(4.9 STAT. (4.25 NAUT.) MI./GAL.)				PRESS		MAXIMUM AIR RANGE																									
R.P.M.										M.P.		MIX- TURE		APPROX.		R.P.M.		M.P.		MIX- TURE		APPROX.		R.P.M.		M.P.		MIX- TURE		APPROX.		R.P.M.		M.P.		MIX- TURE		APPROX.									
T.O.T.										T.A.S.		KTS.		T.O.T.		T.A.S.		KTS.		T.O.T.		T.A.S.		KTS.		T.O.T.		T.A.S.		KTS.		T.O.T.		T.A.S.		KTS.											
GPH.										MPH.		KTS.		GPH.		MPH.		KTS.		GPH.		MPH.		KTS.		GPH.		MPH.		KTS.		GPH.		MPH.		KTS.											
40000 35000 30000														40000 35000 30000						40000 35000 30000						40000 35000 30000						40000 35000 30000															
2700										46		RUN		96		355		310		25000						2700		46		RUN		119		365		315		20000									
2700										46		RUN		115		345		300		15000		2550		F.T.		RUN		100		350		305		2350		F.T.		RUN		80		330		285		2100	
2700										46		RUN										2400		42		RUN		95		330		285		2200		F.T.		RUN		74		310		270		1950	
2700										46		RUN		110		325		280		10000		2400		42		RUN		89		310		270		2200		40		RUN		72		295		255		1900	
2700										46		RUN		106		310		270		5000		2400		42		RUN		86		295		255		2150		40		RUN		66		275		240		1900	
2700										46		RUN		101		290		250		S.L.		2400		42		RUN		82		280		245		2150		40		RUN		62		260		225		1850	
SPECIAL NOTES										EXAMPLE										LEGEND																											
(1) MAKE ALLOWANCE FOR WARM-UP, TAKE-OFF & CLIMB (SEE FIG.) PLUS ALLOWANCE FOR WIND, RESERVE AND COMBAT AS REQUIRED. HIGH BLOWER ABOVE HEAVY LINE										AT 11,000 LB. GROSS WEIGHT WITH 220 GAL. OF FUEL (AFTER DEDUCTING TOTAL ALLOWANCES OF 40 GAL.) TO FLY 1000 STAT. AIRMILES AT 20,000 FT. ALTITUDE MAINTAIN 2100 RPM AND F.T. IN MANIFOLD PRESSURE WITH MIXTURE SET: W										ALT. : PRESSURE ALTITUDE M.P. : MANIFOLD PRESSURE GPH : U.S. GAL. PER HOUR TAS : TRUE AIRSPEED KTS. : KNOTS S.L. : SEA LEVEL F.R. : FULL RICH A.R. : AUTO-RICH A.L. : AUTO-LEAN C.L. : CRUISING LEAN M.L. : MANUAL LEAN F.T. : FULL THROTTLE																											
DATA AS OF 5-8-45										BASED ON: FLIGHT TEST DATA																																					

For use with V-1650-3 engine only regardless of airplane model.

Figure 75 (Sheet 2 of 2 Sheets)—Flight Operation Instruction Chart—One 110-gallon Tank and One 1000-pound Bomb

For use with V-1650-3 engine only regardless of airplane model.